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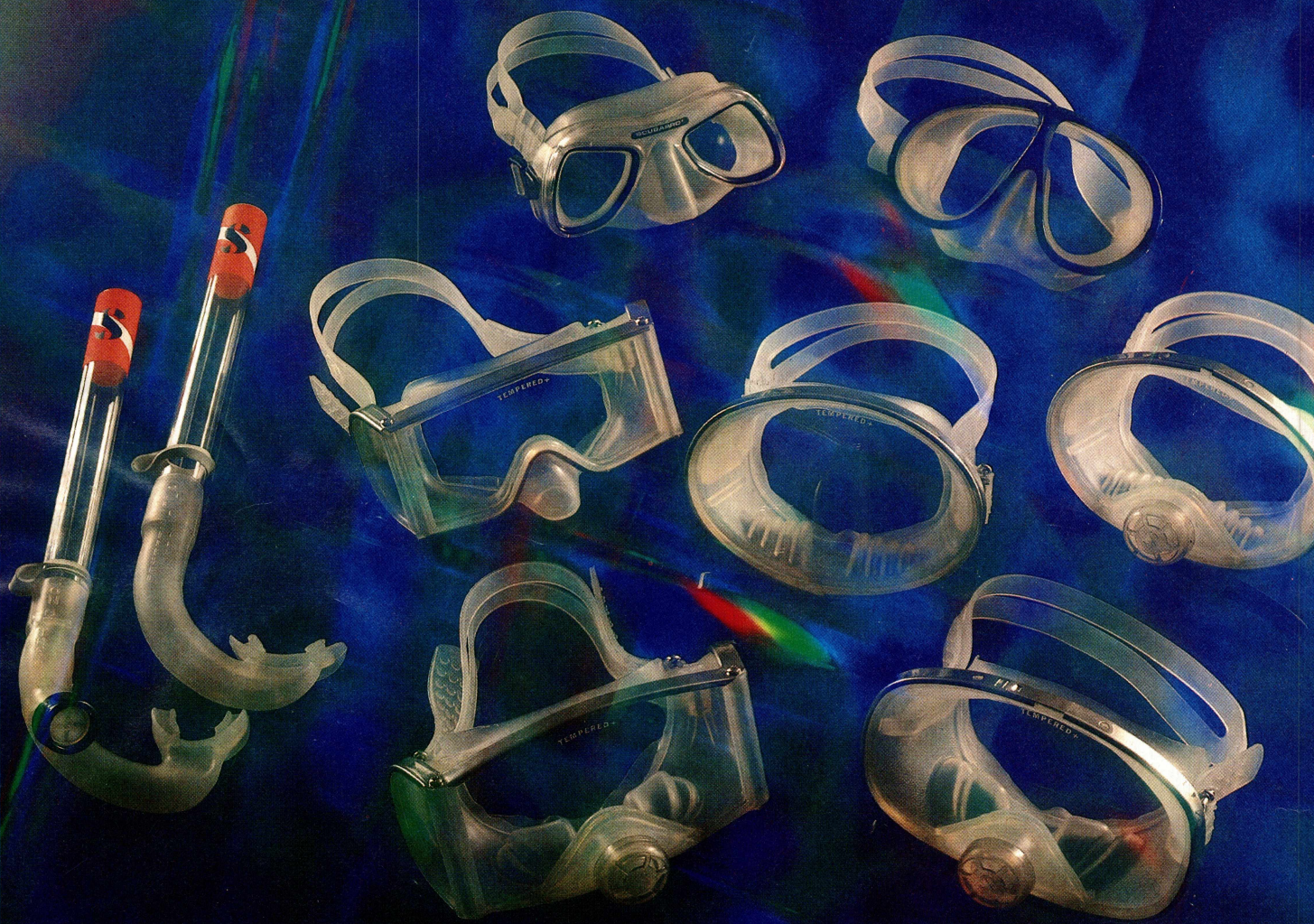
EQUIPMENT REPORTS:

- Vista Mask
- Dive Watches
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- Inflatable Dive Boat



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skin diver

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COVER

World-famous treasure hunter and maritime historian, Bob Marx, holds a sample of the stuff of which a treasure diver dreams — coins from a sunken Spanish galleon. This month Marx tells SDM readers about the booming business of treasure hunting (page 18). Metal detectors play a vital role in the modern UW search for valuable objects, whether they be gold coins, ship's fittings or lost dive gear. (See page 52 — Garrett XS500 metal detector.) Photo/Paul Tzimoulis.



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SDM Editorial

BY THE PUBLISHER

SPRING CLEANING FOR YOUR BREATHING MACHINE

A dive regulator is subjected to a wide variety of corrosive contaminants because of the harsh environment in which it must function. Salt air and saltwater moisture from ocean trips can collect inside and freeze working parts. Carbon dust, chlorinated water, ozone and hard-water mineral deposits can also do damage. The accumulation of these harmful deposits is usually not noticeable because the process is so slow, so gradual.

Even though you have stored it in a cool, dry place, those deadly corrosive contaminants have had their chance to form hard, crusty deposits in the regulator and do more harm than actual use in open water. Much of this damage goes unnoticed because it is happening inside, hidden from the eyes of the owner.

Interviews with several leading regulator repair technicians have revealed seven deadly sins against regulator performance:

1) **HARD BREATHING** is most commonly caused by saltwater corrosion. Internal moving parts become encrusted with salt crystals and a crusty scale, which causes them to stick or operate sluggishly. Inhalation resistance is often tripled or quadrupled, thus making it extremely difficult or impossible to obtain sufficient airflow at depth during heavy breathing.

2) **RUST CLOGGING** the sintered filter of the first stage can be caused by the rust or corrosion dust which accumulates inside a scuba tank. Fine rust particles clog the pores of the filter screen and often coat the internal moving parts, causing sluggish or sticky operation. Rust clogging is a more common occurrence with rental tanks.

3) **CARBON DUST CLOGGING** sometimes results from ultra-fine carbon dust, the by-product of a poorly-operating air compressor. The carbon dust comes from the charcoal filter on the air compressor. This condition may go unnoticed for quite some time because the buildup is so slow and the dust almost invisible.

4) **WATER LEAKAGE** in the regulator mouthpiece is commonly caused by the deterioration of the second stage exhalation valve. The super-thin rubber disc becomes gummed-up from the effects of chlorinated pool water, ozone in the atmosphere, or normal aging. Stickiness of operation can cause increased exhalation resistance, intermittent water leakage and finally, complete flooding of the second stage.

5) **FREE FLOWING** can be caused by dirt or dust particles which mar or dent the high pressure valve seat in the first stage. The smallest speck of dirt or rust on this finely-machined surface can cause a steady seepage of high pressure air into the low pressure hose and second stage. The damage is irreversible and the leak tends to get worse with additional use, until air is flowing out of the regulator mouthpiece in a steady, uncontrolled stream.

6) **O-RING LEAKS** can result from the buildup of salt corrosion inside the regulator or from a general drying out of the silicone lubricant needed to keep these seals healthy. The slightest crack, tear, nick or split on the surface of an O-ring will break the seal and cause either an intermittent or steady leak of air. Continued use of a faulty O-ring can result in a complete break of that seal and the rapid flow of large amounts of air.

7) **ERRATIC FLOW** of air can be caused by a second stage which is not properly tuned or has parts that are sticking. The intermediate stage pressure may be wrong, or the second stage lever improperly set, or perhaps the breathing diaphragm is dried out and brittle. Internal parts and settings go out of whack as a result of aging, hard use, or saltwater exposure.

No amount of washing or careful use can completely prevent your regulator from getting out of tune. Routine maintenance can prolong its good performance, but eventually your regulator will need service and retuning. The job should be done every six months or

once a year, depending on the amount of usage and the kind of exposure your particular unit receives. Generally speaking, a good internal cleaning (ultrasonic or acid dip) by an experienced regulator repair technician will take care of 90 percent of the performance problems. Parts replacement is generally minimal, amounting to a few O-rings, and perhaps a valve seat and more flexible breathing diaphragm.

Considering the vital importance of good regulator function, the cost of cleaning and retuning is surprisingly reasonable, only about \$35, most of which is for technician labor. When you divide this repair charge by the number of months of trouble-free performance you receive, it amounts to a small maintenance charge of two to three dollars per month. It is a small price to pay for the care of a life support device.

Where should you take your regulator for repair? You have several options available. The most obvious is your local professional dive store where you may have originally purchased your regulator or where you regularly obtain air fills. Many pro dive stores maintain a well-stocked service center for the equipment they sell, and their repair technicians are sent to dealer repair workshops conducted by the factory. Another option is to send your regulator to one of the large regulator service centers that specialize in the repair of regulators, hydrostatic testing of tanks, and servicing of other scuba accessories. Your regulator can be mailed in, serviced and returned in less than two weeks. Still a third option is to send your regulator back to the factory where it can be overhauled by personnel who generally have every conceivable replacement part at their disposal.

The most important thing to remember about getting your regulator repaired, cleaned, or retuned is that it should be done *early* in the season. Don't go in the water if your breathing machine isn't performing the way it did the day you bought it.

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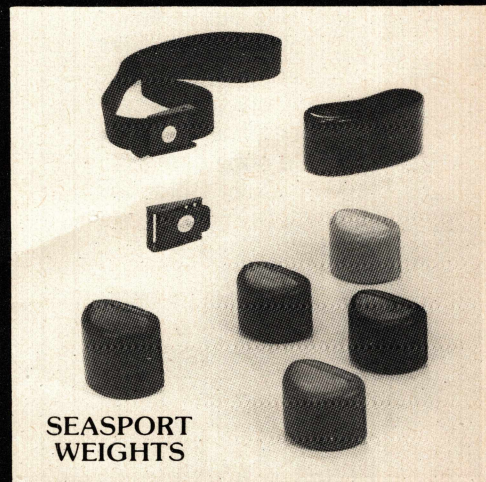
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Diver's Calendar

April 1 Deadline date for entries in the Ken Reed Memorial Photo Contest, sponsored by NAUI North Atlantic Branch. Winners will be announced at the Spring Film Review April 3. (Contact: Tracy Tibedo, P.O. Box 303, Astor Station, Boston, MA 02123)

April 3 NAUI Underwater Symposium, Harvard University Science Center, noon to 6:00 pm. NAUI Underwater Film Review, John Hancock Hall, Berkeley Street, Boston MA, 8:00 pm. (Contact: Fred Calhoun, P.O. Box 291, Back Bay Annex, Boston, MA 02117)

April 4 Second Annual Easter Egg Hunt to Fight Leukemia, La Jolla Shores, San Diego, CA. Sponsored by the San Diego Council of Divers and the Leukemia Society of America. (Contact: Kim Skaalen, 4423 Brighton, San Diego, CA 92107; (714) 224-5090)

April 17 Ninth Annual Underwater Easter Egg Hunt, Chillicothe Sportsman Club. Sponsored by the Orca Dive Club. Refreshments and prizes. (Contact: Orca Dive Club, P.O. Box 1578, Peoria, IL 61655; (309) 697-8039)

April 18 Sixth Annual Dive to Adventure Symposium, State University of New York, Purchase (Westchester County). (Contact: Armand Zigahn, Scuba Sport Rites Club, P.O. Box 644, Rye, NY 10580; (914) 381-4134)

April 23 First Annual Basic Scuba Review at Central Skindivers of Nassau, Inc., Bellmore, NY. Specialty coverage, skill practice. (Contact: Peter, 2608 Merrick Road, Bellmore, NY 11710; (516) 826-8888)

April 24 Tri-City Diver's Club Film Festival at St. Mary's School Auditorium, Johnson City, TN. All-day workshops on photo techniques plus an evening show with movies by Bill Lovin. (Contact: Bernard Kaiman, 250 East Main St., Jonesboro, TN 37659)

April 24 The John Stoneman Showcase, hosted by the Windsor Underwater Society. (Contact: Michael Goodwin, 2695 Norman Road, Windsor, Ontario N8T 1S9; (519) 948-5847)

April 25 New England Divers 9th Annual Equipment Expo and giant pre-season sale. Exhibits by manufacturers, guest speakers, special attractions, door prizes and refreshments. (Contact: New England Divers, 131 Rantoul St., Beverly, MA 01915; (617) 922-6951)

April 30-May 2 Our World Underwater XII seminar and film festival, Radisson Chicago Hotel and Medinah Temple, Chicago, IL. (Contact: Our World Underwater, P.O. Box 4428, Chicago, IL 60608; or phone (312) 452-4445)

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Technifacts

BY E.R. CROSS



After a pleasant reminiscence with **SKIN DIVER** (December, 1981) about the way we were some 30 years ago, it seemed that Technifacts, being the oldest of SDM's columns and being committed to providing technically accurate information, should devote this month's column to adding a few bits of unimportant, but interesting information to articles published in SDM for August, November and December, 1981.

First, the 30th anniversary issue of December, 1981 — in Spencer Campbell's question nine of Magazine Minutiae on page 74 (with answers on page 97); the name of my commercial diving school was the Sparling School of Deep Sea Diving. It was originally started by Joe Sparling as the Sparling School of

Underwater Welding and taught only underwater welding, hoping to permit welders to be able to make ship repairs without drydocking the vessel. The Sparling School was purchased by me in 1947, moved to a new location on Wilmington Boulevard in Wilmington, CA and, with a new curriculum and training schedule, began training commercial divers. For eight years (1947 through early 1956) the Sparling School was the only commercial diving school in the world and was never in Jack London Square. The school at that address in Oakland, CA was opened by Al Mikalow, a graduate of the Sparling School, about a year after the Sparling School closed (in 1957). This would presently make Al's Coastal School of Diving the

oldest commercial diving school in the country (about 26 years old). A student in Al's first class completed his training and proceeded immediately to Florida and opened his own commercial diving school called, I believe, Divers Training Academy, making this the second oldest commercial diving school in the United States (about 25 years old). Since then diving schools have increased in number and today there are at least a dozen in the United States and another dozen or so in various other countries.

Also in Magazine Minutiae (question five and related answer), the manual referred to was called *Underwater Safety*. This was first published in 1954 by my publishing company (Marine Research

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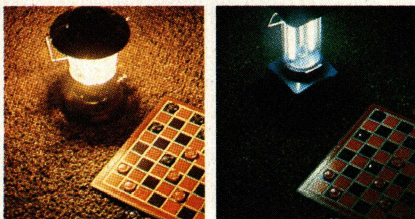
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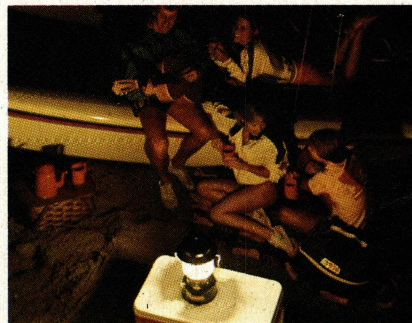


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TECHNIFACTS

Publishing Co.) amidst heated protests from most dive equipment manufacturers, dealers and dive shop operators who thought, "Horrors, Cross is telling everyone that diving is potentially hazardous. Sport diving will never survive this." Fortunately, Healthway's Dick Kline realized the only way to get the danger out of diving was through education and his company took over *Underwater Safety* (in 1955) and, in the next six years sold well over 100,000 copies; a fact that, probably, had a lot to do with the real growth of diving as a sport.

In the early days of the Sparling School I also started a company called Divers Supply. We stocked just about everything anyone in the world would need for diving be it commercial, sport, research or whatever. I had, at the Sparling School, a recompression chamber, dive training and adventure films, and a lot of other early, one-of-a-kind items. Chuck Blakeslee and Jim Auxier and early divers such as lovely Zale Perry, funny man Dick Anderson (also a graduate of the Sparling School and a really excellent commercial diver) the late Connie Limbaugh and dozens of others, spent a lot of Saturdays, Sundays and holidays at the Sparling School-Divers Supply complex. Dive clubs from San Bernardino, Fresno, Sacramento and Phoenix made field trips to Divers Supply for their monthly supply of dive equipment... and for a lot of "talking story" about diving. The Sparling School and Divers Supply became the clearing house for dive information; where to go, what to take, what you might expect to find, etc. In February, 1948, I started a dive publication called Face Plate. Basically it was a news sheet designed for students and graduates of the Sparling School but carried information about sport diving gear, places and people. The editor was E. R. Cross, reporters were Eddie Obel, Fred Molnar, Norman Adam and Mae Green. Art editor was A. Giocalone. There were perhaps 100 copies of the first issue and we had some left over. We printed 100 copies of the second issue and could have used more. By the fourth issue we printed 1000 copies and the publication was taking so much of my time I was neglecting the School and Divers Supply. So, I phased out Face Plate. Now, enter Jim Auxier and Chuck Blakeslee, who had been diving and were good friends at the shop, during these several years. They came in one day in late 1950 and asked to see me in the office away from the daily hustle of divers. Their question, basically, was, "Will a dive magazine be successful?" We talked about the rapid growth of Face Plate and

(Continued on Page 108)

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3 SLR With Autowind—The XG-M 35 mm SLR camera offers the options of motor-drive or autowinder and can be used with aperture priority automatic exposure or manual. An automatic shutter lock prevents an overexposed picture in the automatic mode. The XG-M with a 50 mm f1.7 lens is \$488. From Minolta.

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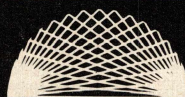


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☐ 1. Trip to Andros ☐ 2. Trip to Plymouth, England



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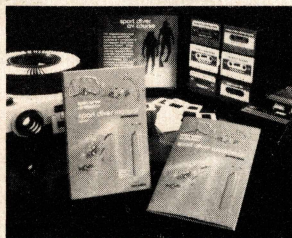
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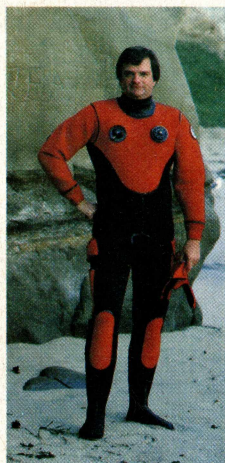
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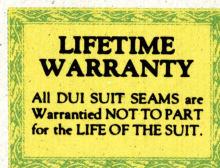


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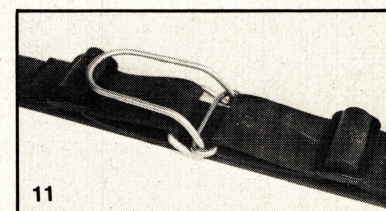
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9 Anti-Fog Composition—Developed by NASA for use on space helmets, this compound works well in summer rains and winter cold. Numerous applications include bathroom mirrors, motorcycle helmets, goggles, windshields and dive masks. 8 oz.—\$6.50. Tracer Chemical Corp., P.O. Box 7494, Tampa, FL 33673.

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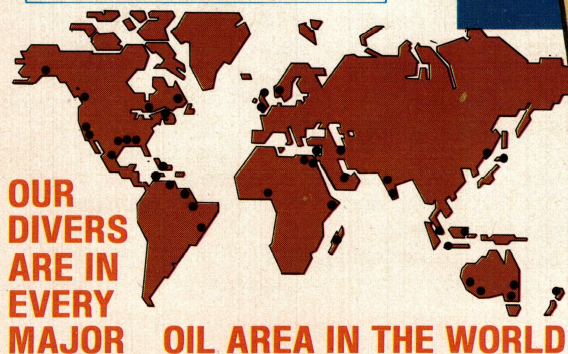
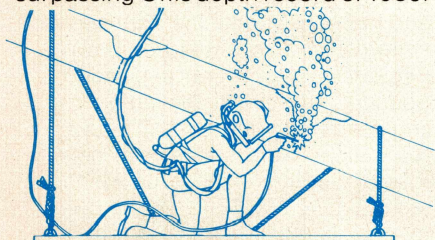
Oceaneering International designed Commercial Diving Center's training programs, moving over 40% of the graduates into key jobs under world-wide diving contracts. The others may opt to work for some 200 diving contractors who look upon C.D.C. as a producer of high-quality trainees ready to take on any job with any type of equipment.

The reason is:

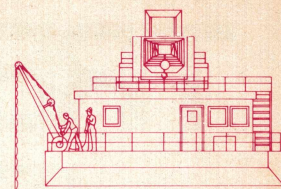
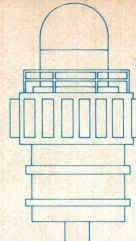
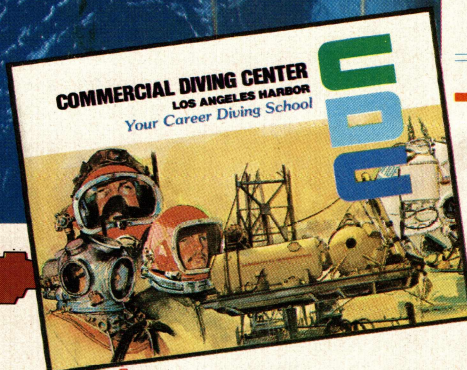
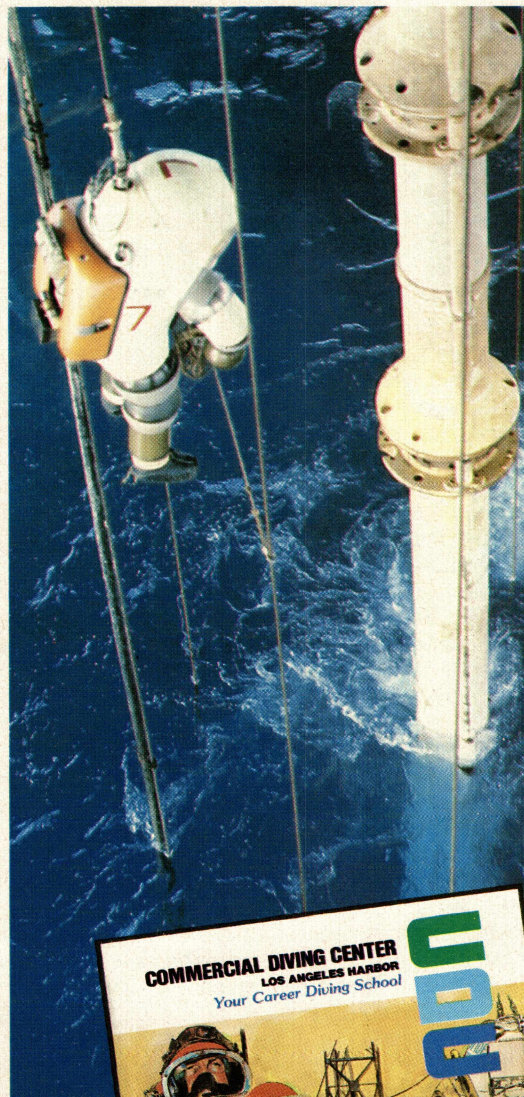
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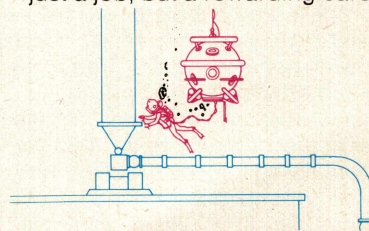
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TREASURE HUNTING

IT'S BECOME BIG BUSINESS

BY ROBERT F. MARX

A diver's dream of shipwrecks and sunken treasure generally conjures up images of bulky Spanish galleons, their holds crammed with gleaming riches. And not without reason, for in the years between 1492 and 1820 the Spaniards extracted over five billion pesos in gold and silver from their New World mines, the bulk of which was shipped aboard the famous galleons. Of this amount, more than ten percent was lost on the way to Spain, most of it in the treacherous shallow waters of the Caribbean and the Bahamas.

Treasure hunting has flourished in the West Indies and along the Spanish Main for almost 500 years. The Spanish conquistadores and their descendants employed Indian and Negro divers to recover many precious cargoes. Around the beginning of the 17th century, the English entered the salvage game, which they dubbed "wracking." Although early salvors were able to bring up a prodigious amount of treasure it actually amounted to less than 20 percent of the total lost. Primitive dive gear and a lack of capable equipment kept them from plumbing the sand and sediment which often covered the wrecks.

With the introduction of scuba equipment, underwater treasure hunting became the focus of thousands of amateurs propelled by bubble-bright visions of glistening doubloons and chests overflowing with golden treasures, pearls and emeralds.

Fantasy became reality for a small number of these dreamers. In 1963, two teenagers diving for lobster on a shallow reef near Vero Beach, Florida discovered more than \$200,000 in gold coins. They lay exposed on the sandy bottom, still as shiny as the day they were minted. It took the boys less than two hours to gather all the treasure using no more than snorkeling equipment.

Even more startling was the fortuitous find a vacationing diver from Georgia made in Grand Cayman in 1969. While meandering along the shore with his wife in search of seashells he came across a gold cross inlaid with diamonds in water three feet deep. Keeping his discovery mum, the man came back to the site with his scuba gear and proceeded to literally strike it rich. He

fanned away a thin layer of sand and uncovered a fantastic cache which included a large bar of platinum dated 1521, various pieces of silver bullion, a three pound gold disc, a gold bracelet in the form of an emerald studded serpent, and numerous other gold artifacts. Subsequent research showed that his find came from a small ship returning to Spain with loot seized by conquistadores in Mexico.

Almost every year in the 1950's and '60's shipwrecks were found which yielded millions in silver, gold and artifacts. Then, like most gold mine bonanzas which eventually play out, the treasure hunting business went into a decline for all but a handful of the more knowledgeable professionals. Most of the wrecks lying exposed for easy picking had been found and worked. The remaining sites are often remote, frequently buried deep beneath sand or coral. It takes expertise, sophisticated equipment and lots of money to find and work them. For every dollar made from treasure hunting in the 1970's ten were spent with disappointing results. In 1973 a well-known archaeologist summed up his feelings about searching for sunken riches in a press interview: "Take all the money you can get — \$200,000 would be a nice round number — get a boat and run out into the ocean a way. Then pile the money up on the deck and drink a beer while the wind blows it away. That way you can waste your money without all the miserable, hard work involved in a treasure hunt and the return to you should be about the same as if you'd actually gone treasure hunting — zilch." In actual fact, the prospects were never quite that bleak; at least for a well prepared project.

The image of underwater treasure hunters as romantic crackpots chasing the pot of gold at the end of the rainbow has changed in recent years. My discovery of the 1656 *Maravillas* galleon in the Bahamas, Mel Fisher's find of the *Margarita* and *Atocha* and the success of Burt Webber with the *Concepcion* treasure have attracted the attention of Wall Street. In the past, investors were content to participate in a small way in treasure hunting, more for the opportunity of living out a fantasy a la Walter Mitty than in

hopes of getting a return on their money. Today, investors look at this field as one with real investment potential from a business point of view. Millions are being invested by savvy men who expect more than a tax write-off. One tycoon recently stated that, "investing in underwater treasure hunting is as safe as searching for offshore oil, with the added incentive of making more money and having more fun doing it." Of the four richest men in Texas, three are presently investing big bucks in underwater treasure hunts. Using the latest in technological developments, some firms are spending as much as \$20,000 a day in the quest for underwater riches.

Most of today's professional treasure hunters launched their careers in the days when scientific method played a small part. Typically, a treasure hunt began when a waterfront chat with a fisherman who knew of a place where "cannons lie strewn on the bottom" fired a diver's imagination. It wasn't unusual for the fisherman to offer to show the location for a fee, paid in advance of course. Nor was it unusual for the guide, once he had pocketed the money, to fail to relocate the wreck site, claiming it had been covered over by shifting sands or stripped by pirate divers. In fact, if the site was found it often had been picked over by earlier treasure hunters.

The airlift was the principal tool for salvage in the 50's and 60's. It was a slow, tedious way to work and unless they were lucky and happened to hit the right spot on the site (which might well be strewn over a square mile or more) and found some treasure, they eventually ran out of operating funds and the dream faded. Some operations were successful, notably those of the Real Eight group which salvaged over \$10,000,000 from the galleons of the ill-fated 1715 fleet which went down in a hurricane off the east coast of Florida. Real Eight owed its success in large measure to the development of the prop-wash or blaster. This new tool resembles a piece of elbow macaroni and fits over the propeller. It proved 50 times more effective than the old airlift and revolutionized underwater excavation.

Today the treasure hunter no longer relies on fishermen's tales or simple equip-

ment. Most professional operations employ full-time researchers who comb the archives and libraries of the world for accurate locations, cargo manifests and other pertinent information regarding shipwrecks.

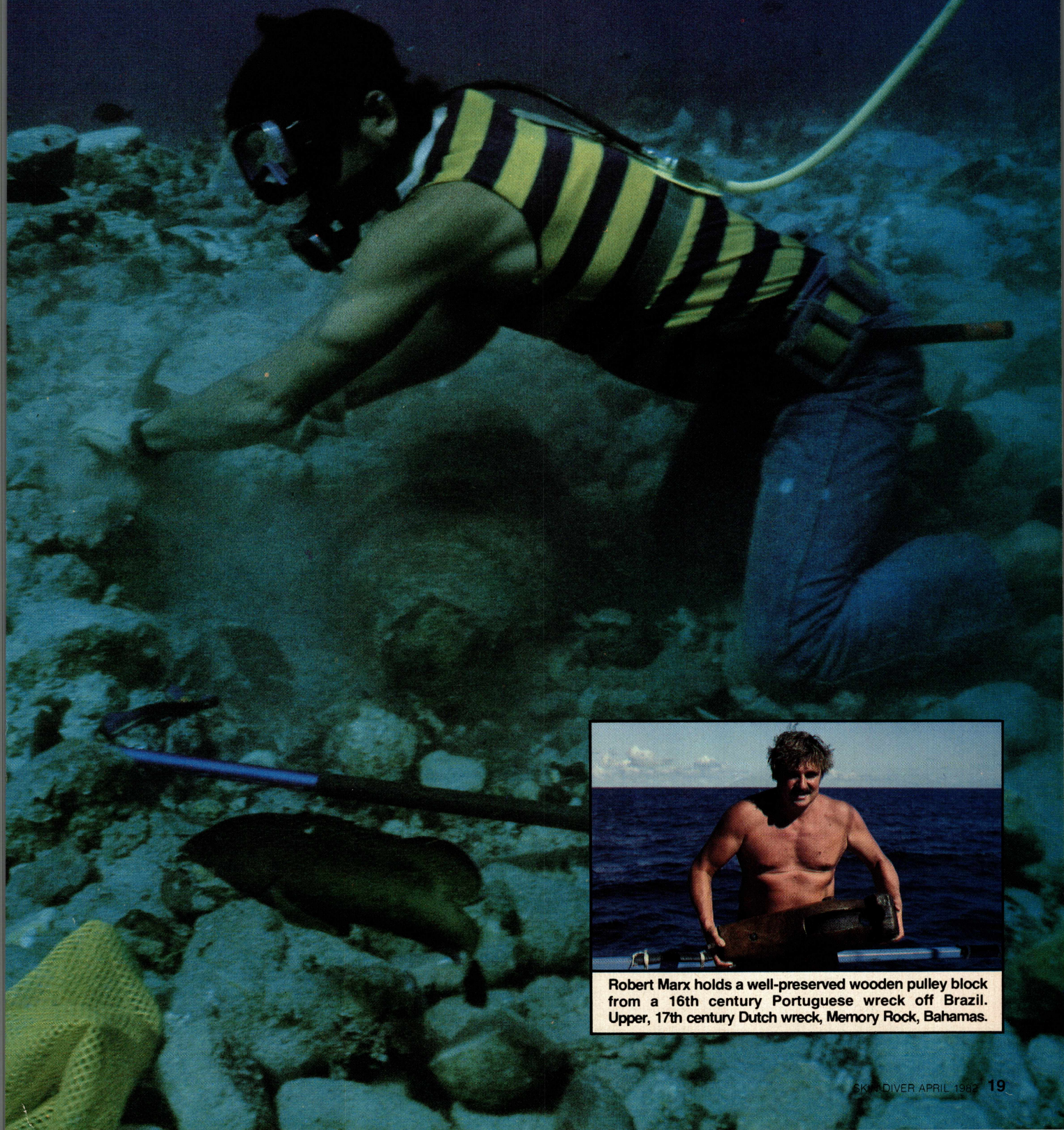
To locate a shipwreck, hunters no longer rely on sighting it from above the surface or dragging a diver on what is known as a shark line behind a skiff. During the search for the 1641 *Concepcion* galleon, Burt Webber's firm spent over \$50,000 conducting an aerial survey and completely mapped Silver Shoals before

starting the search in the water. Just this past year a Florida group tested a new method of aerial search utilizing a secret gamma ray scanner which detects the presence of minerals such as gold and silver buried beneath the sea floor. The magnetometer is still the standard workhorse in any shipwreck search but most treasure hunters now also use various types of sonar — some of which cost as much as \$100,000.

Great improvements have been made in underwater metal detectors, which are also a great boon to the business. Not

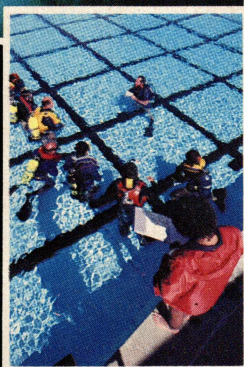
only the equipment but also the vessels used today illustrate how greatly things have changed in the past few years. Currently there are boats valued at over a million dollars employed in treasure hunting. They are designed for specific projects and fitted out with an array of electronic gadgetry which would boggle the mind of an old wracker.

To get an idea of the capital being poured into treasure hunting ventures today, take a look at the search currently underway for the Spanish galleon, *San Jose*, off the coast of Colombia. The



Robert Marx holds a well-preserved wooden pulley block from a 16th century Portuguese wreck off Brazil. Upper, 17th century Dutch wreck, Memory Rock, Bahamas.

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TREASURE HUNTING

wreck, which is the richest ever to sink in this hemisphere, went down somewhere off Cartagena in deep water — between 200 and 1500 feet. Over the past decade more than \$10,000,000 has already been spent in vain efforts to locate her cargo of treasure, estimated at a fabulous \$50 to \$100 million. An American group which has been seeking the elusive *San Jose* for some ten years has competition from three other groups — French, English and American — with combined assets of \$8,000,000 to spend — who are applying to the Colombian government for permission to try their luck with submersibles and mixed-gas divers. In the past six months alone, five additional groups have floated stock issues totalling \$13,000,000 to go after treasure wrecks in Haiti, Santo Domingo, Panama, the Azores and Spain. But it is a case of *caveat emptor*, let the buyer beware, for just as treasure hunting is drawing big investors it is also attracting its share of con men.

Mel Fisher, familiar treasure hunting figure, no longer has to spend most of his time persuading potential investors to share his dreams and the rest scraping the ocean floor with little more than bare hands and his renowned hunches. He has traded his ramshackle houseboat and rusty old car (purchased 15 years ago with 18th century gold coins) for a lovely Key West house and a new Lincoln. He has six salvage boats working and a staff of over 70 people. His operations are funded by a well organized investment firm and a retinue of lawyers and accountants handle the myriad details such a complex operation entails. Fisher has a team of qualified archaeologists who help him dispel the image of treasure hunters as reef rapers who heedlessly plunder sites. In 1981 his firm spent close to \$100,000 gathering archaeological information. Since 1970 Fisher has spent over \$8,000,000 in his passionate quest for the treasures of the 1622 galleons.

Spanish treasure ships now attract more than swashbuckling treasure divers. During the past year a team of archaeologists under the direction of Dr. George Bass of the Institute of Nautical Archaeology, who previously concentrated on ancient classical wrecks in the Mediterranean, worked on several galleons off Jamaica's south coast.

Even non-divers strike it rich once in a blue moon! Several months ago an elderly Florida woman, digging for clams in the Indian River near Sebastian Inlet, chanced upon a 12 pound gold disc, dating from the 1715 fleet disaster. Such finds ensure that the lure of sunken treasure is unlikely to diminish.

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Nikonos IV with 35mm f2.5 lens. \$ 349.00
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Sunpak Marine 32 underwater electronic flash: includes strobe, tray, and diffuser \$ 289.50

Toshiba TM-2 underwater electronic flash \$ 199.00

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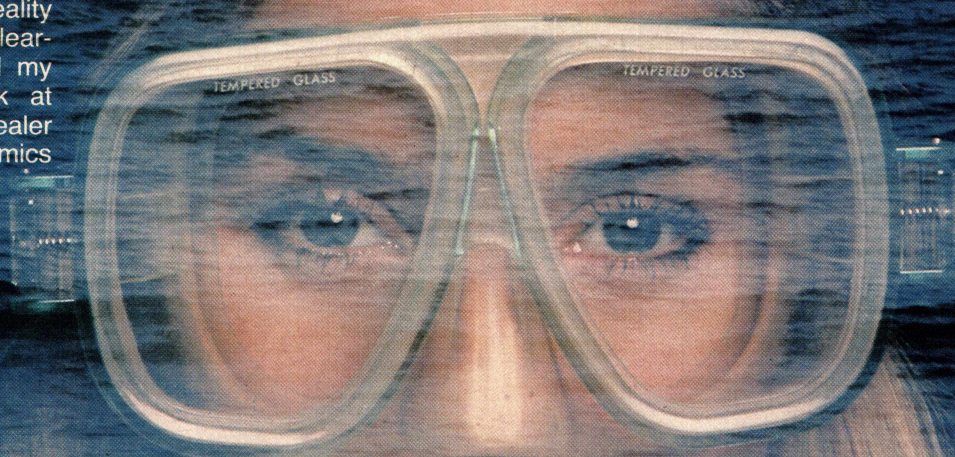
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Chicago, Illinois 60610

For information: 312/944-4400

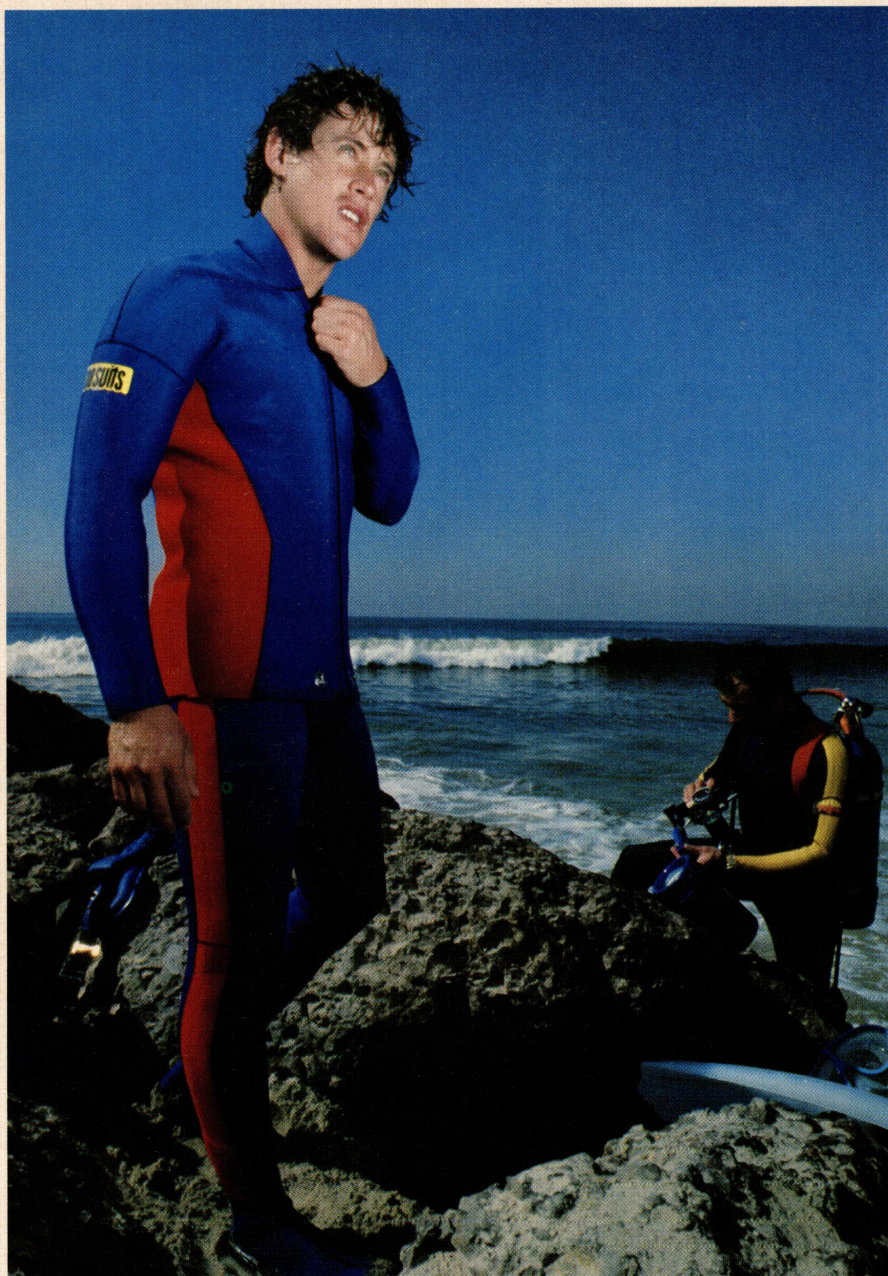
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SCUBA IQ BOOK

The second volume of the popular test question and answer book, *What's Your Scuba IQ?* is now available. Volume II contains the 40 latest exams from the SKIN DIVER Magazine Scuba Quiz series.

Designed to stretch the thinking of experienced divers and overcome misconceptions about diving, the questions in *What's Your Scuba IQ?*, Volume II provide a challenging and interesting means of learning. As a test question source, a reference, or a means to refresh or expand knowledge, the book is valuable to all divers and instructors.

Author, Dennis Graver, also director of training for the Professional Association of Diving Instructors (PADI), says he, "enjoys the opportunity to use the exam series format to share information that is not known by the majority of divers and which can make diving safer and more enjoyable."

To obtain the book, send \$7.95 with your order to PADI, Box 15550, Santa Ana, California 92705. Price includes postage within the U.S. ➤

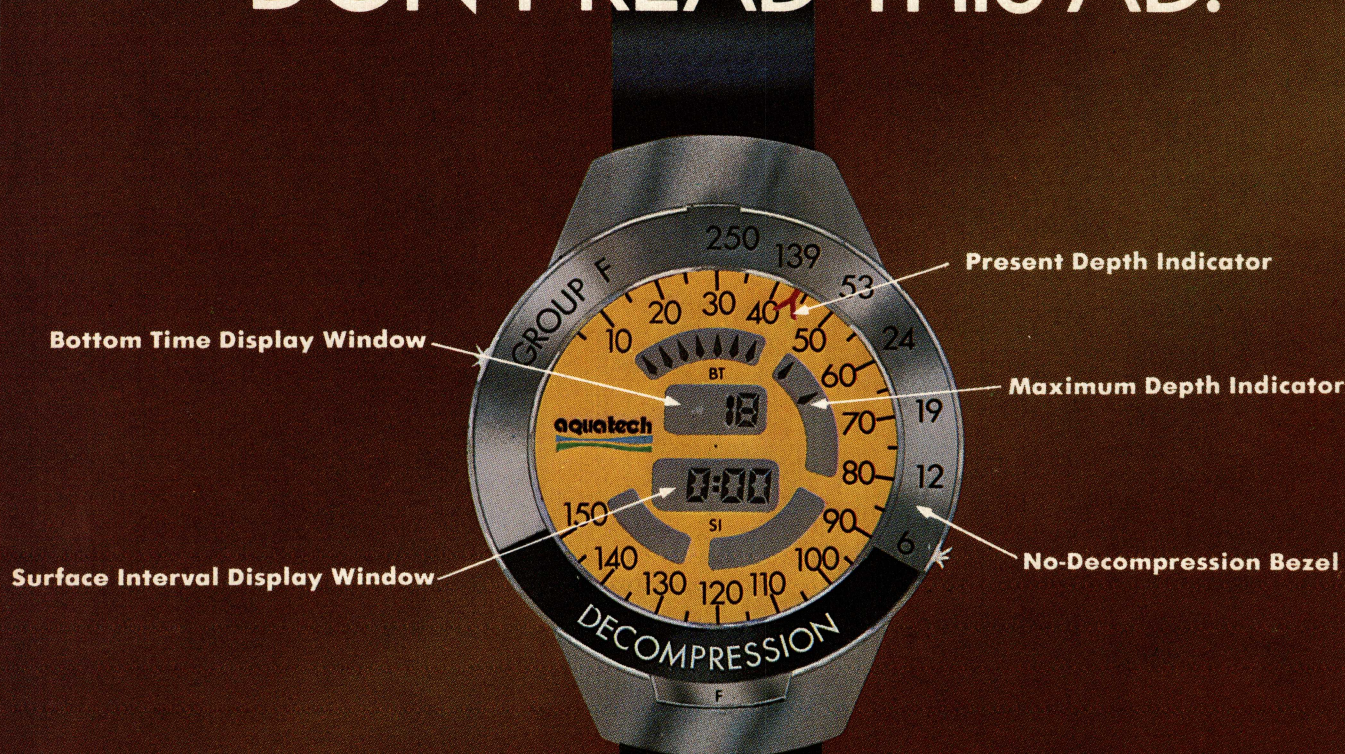
RETROACTIVE CERTIFICATION

Commercial divers who have graduated from EMT(I) level diver medic training courses may be eligible for nationally recognized certification through the National Association of Diver Medical Technicians (NADMT). NADMT president Larry Cushman stated that active commercial divers and commercial diving school graduates who have successfully completed the EMT(I) level diver medic training programs at the Commercial Diving Center (Los Angeles), Florida Institute of Technology (Jensen Beach), the Ocean Corporation (Houston) and other ACDE-approved commercial diving schools may request NADMT certification. Other active divers who have completed diver medic training at the equivalent level may also be eligible for retroactive certification and should contact: NADMT, c/o The Ocean Corporation, 5709 Glenmont, Houston, TX 77081. ➤

UTAH U/W HUNTING

In recognition of the state of Utah opening many of its lakes, JBL and Cross International of Orem, Utah are sponsoring an underwater hunting and collecting course, taught by Ron Pavelka, a PADI instructor. The class will follow PADI standards, touching on all aspects of underwater collecting and emphasizing underwater hunting and spearfishing. The course will run from June 26-28. For any further questions, contact: Jim Cross, Cross International, 155 W. 800 North, Orem, Utah 84057. ➤

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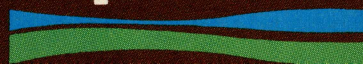
Along with a depth gauge that continuously displays your present depth, the VANGUARD™ utilizes interchangeable no-decompression bezels for each repetitive group designation.

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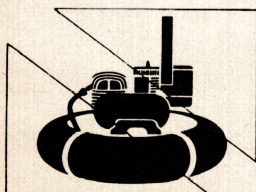
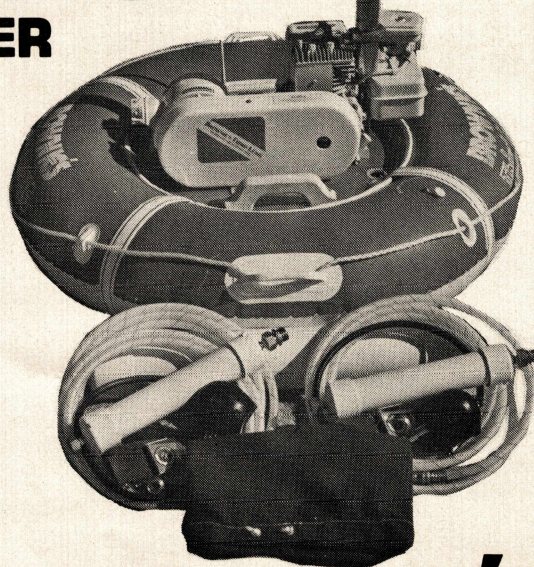
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NEW PADI HEADQUARTERS

PADI Headquarters has recently completed its relocation to a new 10,000 square foot building, custom designed for PADI. The new building is consolidated into departments and now includes the publications staff. Inventory warehouse and shipping departments



have doubled in size. The new facility is easily accessible from the freeway and has a large conference room for local seminars.

The address of the new facility is: 1243 East Warner Avenue, Santa Ana, CA 92705. Phone (714) 540-PADI.

PADI EXPANDS COMMUNICATIONS

The Professional Association of Diving Instructors has expanded communications systems both domestically and internationally. The recent installation of a new Telex machine, Horizon telephone system and an automatic mailing system provides additional services.

In combination with other PADI services recently implemented, including the Regional Training Coordinator program and an additional quarterly publication for divers, Diving Ventures, this modern equipment provides more efficient service and improved communication.

For information about PADI programs and services, contact PADI Headquarters at 1243 E. Warner Ave., Santa Ana, CA 92705; phone (714) 540-PADI or Telex 678400.

CHAMBER OPERATORS COURSE

A seven day Hyperbaric Chamber Operators course will begin on June 12 at the Jensen Beach campus of Florida Institute of Technology, according to Charlie Vallance, Underwater Technology Department head.

The course is designed to qualify individuals in the basics of hyperbaric chamber operation and maintenance. Approximately 75 percent of the course will involve hands-on operation of hyperbaric chambers.

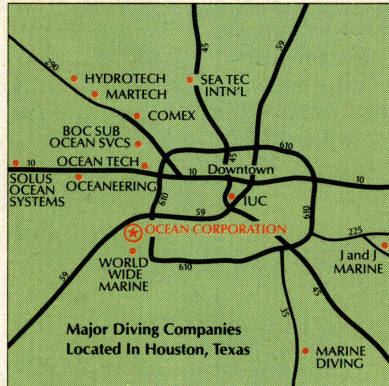
The program is intended for physicians, medical technicians, nurses, paramedics, EMT's, rescue personnel, diving instructors or other professionals.

For further information phone (305) 334-4200 ext. 80, continuing education, or Charlie Vallance at ext. 49.

Why Houston?

BECAUSE

The Ocean Corporation is located in Houston and more commercial divers are hired in Houston than in any other place in the world. Twelve diving companies are located in Houston including three of the four largest in the U.S. Many others are located in the nearby New Orleans area. The demand for divers is so great in Houston that large locally based diving companies like Ocean Systems, Hydrotech Systems, Martech International and Sea Tech International have hired many of our students for part-time work while they were attending school. Over 90% of our recent graduates went to work for these and other local diving companies when they completed our program. Houston is the place where the action is...the commercial diving, offshore construction and oil industry capital of the world.



BECAUSE

The Ocean Corporation is a commercial diving company, not just a school. Our facilities, equipment and training aids are the best, and our diving systems are as up-to-date as possible... because much of the equipment is used by our diving operations division to perform actual diving contracts in the field. Ocean Corporation has successfully completed many underwater jobs for various industrial clients over the years... including specialized underwater inspections, maintenance and repair work. For example, we did the world's first commercial underwater repair job in a nuclear power plant. And most of our divers have been graduates of our own school.



BECAUSE

The Ocean Corporation is a convenient and exciting place to go to school. Houston is one of the fastest-growing and most dynamic cities anywhere. It is a city of expansion, energy and youth (the average resident's age is in the mid-20's). Houston offers every conceivable kind of entertainment, from sports events, ultra-modern discos and open-air theater to rough-house local rodeos, chili cook-offs and the new Texas-size

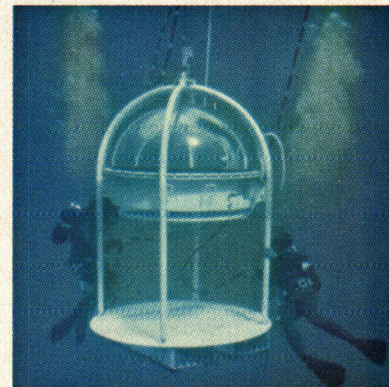


country-western dance clubs. Reasonably priced adult and singles apartments are readily available within walking distance of the school, and fast-food to luxury restaurants are nearby. The semi-tropical climate is wonderful, the sport diving is great and the folks are friendly.

BECAUSE

The Ocean Corporation management and instructor staff have long-term experience in the international offshore oilfield diving business. Retired ex-military divers and sport scuba divers don't run the school...commercial divers do. For example, the President of The Ocean Corporation, Larry

Cushman, was Vice President and Europe/Africa Area Manager for Ocean Systems, Inc. for three years...with responsibility for all North Sea diving and underwater construction operations. He also worked six years as a manager for Oceaneering International, Inc., another of the world's largest commercial diving contractors. Ocean Corporation managers and instructors know today's diving business...first-hand, from recent experience.



The Ocean Corporation

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If you are interested in becoming a commercial diver, please write and ask for our free information package on job opportunities, our school and our super city. If you'd rather call, make it collect and ask for Fred Tourtel
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APRIL, West Pacific Branch - Bangkok, Thailand, Dusty Rhodes, JUSMAG-THAI, Box R-3022, APO San Francisco, CA 96346

APRIL, West Pacific Branch - Honolulu, Hawaii, weekends, Brad Revis, 98-025 Hekaha St., Aiea, HI 96701; (808) 487-9060

APRIL-MAY, North Atlantic PDC - Rockport, Mass., Robert Foote, 25 Eliza Lane, Greenfield, MA 01301

APR. 2-10 Ventura, Calif. - Bill Miller, Ventura College Athletics Dept., 4667 Telegraph Road, Ventura, CA 93003; (805) 487-1238

* APR. 10-17, Professional Development Center APR. 13-21, Sydney, Australia - Reg Boer, 33 Fanny St., Annerly Q4103, Australia

APR. 16-25, West Pacific - Aquaventure Phils., Inc., 20-A Dona M. Hemady St., Quezon City, Philippines; Amado de Vera, Course Director.

** APR. 21-28, Professional Development Center MAY, West Pacific Branch - Honolulu, Hawaii, weekends Bob Hoffman, 94-366 Pupupani St. #117, Waipahu, HI 96797; (808) 671-0300

MAY, Aquadilla, Puerto Rico - Jaime Vives, Scuba Centro Inc., Ave. Northmain 25-25 A-11, Sierra Bayamon, Bayamon, Puerto Rico 00619

* MAY 8-15, Professional Development Center ** MAY 17-24, Professional Development Center

MAY 22-29, Mid Atlantic - Greenville, North Carolina, Course Director, Gery Putnam, 3760 Rockbridge Rd., Virginia Beach, VA 23455; (804) 460-3178

JUNE, North Atlantic PDC - Weekends at Springfield College, Robert Peck, Project DEEP, P.O. Box 415, Northampton, MA 01061

JUNE WEEKENDS, San Bernardino, Calif. - Susan Bangasser, 12724 Valley View Lane, Redlands, CA 92373; (714) 794-4495

* JUNE 5-13, Professional Development Center JUNE 6-13, Grand Cayman - Contact Glenn Galtore, FLAG (Royal Palms) Underwater Services, P.O. Box 490, Grand Cayman, B.W.I., Phone 92636

JUNE 6-12, North Atlantic PDC - Bridgeport, Conn., Noel Voroba, Orbit Marine Sports, 3273 Fairfield Ave., Bridgeport, Conn. 06605

SUMMER, North Atlantic PDC - Binghamton, N.Y., Larry Marshall, 1123 Ivon Ave., Endicott, N.Y. 13760

SUMMER, North Atlantic PDC - New York City, Walt Hendrick, 348 E. 89th St., (#1-E), New York, N.Y. 10028

** JUNE 13-20 - Professional Development Center JUNE 19-26, Mid Atlantic - Dayton, Ohio, Course Director, Dan Orr, Wright State University, Dayton, OH; (513) 873-3223

JUNE 26-JULY 3, Southwest - Albuquerque/Santa Fe, New Mexico, Bruce Wienke, Los Alamos National Laboratory, Los Alamos, N.M. 87545

JULY, FSU Marine Lab - Tallahassee, FL, Robert Fronk, 7982 Timberlake Dr., West Melbourne, FL 32901

JULY 2-11, San Diego State University - Mark Flahan, San Diego State University, San Diego, CA 92182; (714) 265-6523

JULY 9-18, San Diego, Calif. - Mark Flahan Center for Marine Studies, SDSU, San Diego, CA 92182; (714) 265-6523

* JULY 10-17, Professional Development Center JULY 10-18, Buffalo, N.Y. - Dallas Edmiston, 39 Garfield St., Lancaster, N.Y. 14086; (714) 681-2932

*9547 Valley View Cypress, CA 90630; (714) 761-8348

** (Hall's Diving Center), 1688 Overseas Highway, Marathon, FL Keys 33050; (305) 743-5929

**For further information contact:
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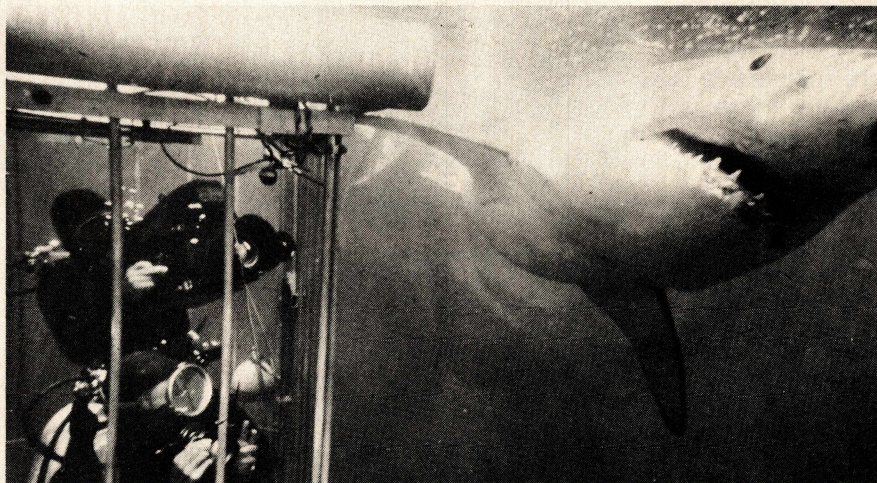
SDM INTERVIEW

Ron and Valerie Taylor

BY HILLARY HAUSER

In 1951, a young Ron Taylor found a pair of goggles in the bottom of an estuary pool in Botany Bay, Australia, put them on and looked around at the marine life. He was hooked on what he saw almost as instantly as if he'd been a fish on a line. At age 16 he learned how to take black and white pictures. At 17, a friend

made for the Queensland Government Tourist Bureau. It was shown at the Santa Monica Film Festival in 1966. In 1968 the Taylors stopped spearfishing. "Ron and I noticed how the fish life became depleted as more and more people began spearfishing," says Valerie, "and we stopped."



photo/Peter Lake

came around with a 16 mm camera and Ron made an underwater housing for it. His friend supplied the film and Ron shot underwater movies. His first completed film, made in 1957, was a black and white epic entitled, *Crays at the Gibba*. After that came another black and white film, *The Shark Hunters*, which was Ron's first commercial success; he sold it to NBC-TV in 1962.

Spearfishing was a new idea in those days and, as in other parts of the world, spearfishing competitions were quite the rage in Australia. Ron soon became one of Australia's champion spearfishermen. He also joined the St. George Underwater Club in Sydney.

Valerie Heighes began snorkeling and diving in front of her parents' waterfront home in Sydney. In 1963 (at 27) she won the Australian women's spearfishing championship. She also joined the St. George Underwater Club, and here she met Ron Taylor.

Ron and Valerie were married in 1964 and on their honeymoon they went to a spearfishing competition on Kangaroo Island. About this time Ron completed his first color film, *Skin Diving Paradise*,

With spearfishing behind them, the Taylors did nothing but dive and photograph, and they have made a steady ascent to film fame. Sharks are the main targets of their cameras. Ron Taylor has the distinction of being the first person in the world to film great white sharks in their natural element. He filmed them in 1965 without cages. His early footage was what sparked interest in Peter Gimbel's proposed project *Blue Water - White Death*. When financial backing came through for the film, which was a cinematic search for the great white shark, Ron and Valerie were principal actors, divers and camera people. It was filmed during 1969 and 1970 in various oceans of the world and became a box office hit. Ron and Valerie have since won international acclaim for their filming of sharks for *Jaws* (I and II), and for their underwater photography on major motion pictures such as *Orca* and *The Blue Lagoon*. They have shot and produced films for a number of American television specials, including *Wild Wild World of Animals*, and more recently, *Those Amazing Animals*. It was during

(Continued on Page 88)

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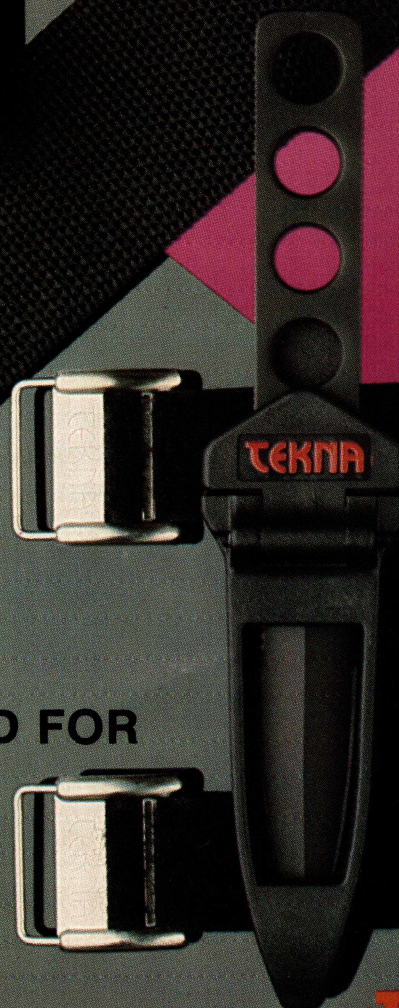
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TEKNA

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The repetitive dive tables shown on these pages are some of the most colorful now in existence. Produced by Jeppesen Sanderson, Inc., they are part of a teaching system that includes audio/visual aids, manuals, workbooks, logbooks and exams, all color coded distinctively in blue and gold.

Jeppesen Sanderson has specialized in flight training programs and air navigation charts for instrument pilots for decades. The company got into scuba training when Frank Johnson, Director of Marketing Products, took a certification course in 1975. Amazed by the lack of class materials, he developed his own. Unable to get a particular instructor agency to back his efforts, he put the material out under the Jeppesen Sanderson name.

Johnson developed the Open Water Manual. Don Sellars was responsible for the audio/visual material that complemented it. Later, Mark Whitaker, Marketing Manager, Sport Diver Products, developed the manuals, logbooks and A/V material for the Jeppesen Sanderson Advanced Open Water program. He is also responsible for the arrangement of and color on the tables reproduced here.

The Jeppesen tables are part of the Open Water student kit which also contains a logbook, workbook and manual. They are available separately for 80¢. The tables are printed on a special paper with some interesting characteristics: It is waterproof and will take all sorts of abuse without tearing. Take it underwater, crumple it, roll it, fold it, sit on it — you can still smooth it out and be able to read it.

The Jeppesen Sanderson system is impressive. The tables are practically indestructible as well as pretty. But, you might ask, are they accurate and easy to use? Well, these are the familiar U.S. Navy Tables, the

sport diver open water u.s. navy dive tables

no-decompression limits and repetitive group designation table for no-decompression air dives

Depth (feet)	No-decompression limits (min)	Group Designation														
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
10		60	120	210	300											
15		35	70	110	160	225	350									
20		25	50	75	100	135	180	240	325							
25		20	35	55	75	100	125	160	195	245	315					
30		15	30	45	60	75	95	120	145	170	205	250	310			
35	310	5	15	25	40	50	60	80	100	120	140	160	190	220	270	310
40	200	5	15	25	30	40	50	70	80	100	110	130	150	170	200	
50	100		10	15	25	30	40	50	60	70	80	90	100			
60	60		10	15	20	25	30	40	50	55	60					
70	50		5	10	15	20	30	35	40	45	50					
80	40		5	10	15	20	25	30	35	40						
90	30		5	10	12	15	20	25	30							
100	25		5	7	10	15	20	22	25							
110	20			5	10	13	15	20								
120	15			5	10	12	15									
130	10			5	8	10										
140	10			5	7	10										

residual nitrogen timetable for repetitive air dives

*Dives following surface intervals of more than 12 hours are not repetitive dives. Use actual bottom times in the Standard Air Decompression Tables to compute decompression for such dives.

Red denotes no-decompression limits. For the residual nitrogen times listed below, all dives in the area left of the red line will require the use of a Standard Air Decompression Table to compute decompression times and depths.

NEW GROUP DESIGNATION REPETITIVE DIVE DEPTH	Repetitive group at the beginning of the surface interval															A
	Z	O	N	M	L	K	J	I	H	G	F	E	D	C	B	
40	257	241	213	187	161	138	116	101	87	73	61	49	37	25	17	7
50	169	160	142	124	111	99	87	76	66	56	47	38	29	21	13	6
60	122	117	107	97	88	79	70	61	52	44	36	30	24	17	11	5
70	100	96	87	80	72	64	57	50	43	37	31	26	20	15	9	4
80	84	80	73	68	61	54	48	43	38	32	28	23	18	13	8	4
90	73	70	64	58	53	47	43	38	33	29	24	20	16	11	7	3
100	64	62	57	52	48	43	38	34	30	26	22	18	14	10	7	3
110	57	55	51	47	42	38	34	31	27	24	20	16	13	10	6	3
120	52	50	46	43	39	35	32	28	25	21	18	15	12	9	6	3
130	46	44	40	38	35	31	28	25	22	19	16	13	11	8	6	3
140	42	40	38	35	32	29	26	23	20	18	15	12	10	7	5	2

residual nitrogen times (minutes)

JEPPESSEN

Colorful, waterproof and indestructible

By Bonnie J. Cardone

repetitive dive memory jogger

I. PREVIOUS DIVE	III. RESIDUAL NITROGEN TIME:
_____ minutes _____ feet _____ repetitive group designation from No-Decompression Limits Table	_____ feet (depth of repetitive dive) _____ new repetitive group designation from II _____ residual nitrogen time from Residual Nitrogen Timetable
II. SURFACE INTERVAL:	IV. EQUIVALENT SINGLE DIVE TIME
_____ hours _____ minutes on surface _____ repetitive group designation from I _____ new repetitive group designation from Residual Nitrogen Timetable	_____ minutes—residual nitrogen time from III + _____ minutes—actual bottom time of repetitive dive = _____ minutes—equivalent single dive time _____ minutes—no-decompression limit from No-Decompression Limits Table

dive profile

Dive #1	Dive #2	Dive #3
SURFACE INTERVAL TIME TIME DOWN GROUP NEW GROUP TIME DOWN BOTTOM TIME (MINUTES) DEPTH TIME UP	SURFACE INTERVAL TIME GROUP NEW GROUP TIME DOWN BOTTOM TIME (MINUTES) DEPTH TIME UP	SURFACE INTERVAL TIME GROUP NEW GROUP TIME DOWN BOTTOM TIME (MINUTES) DEPTH TIME UP

No-Decompression Limits and Repetitive Group Designation Table for No-Decompression Air Dives

To find the repetitive group designation, enter the table at the depth equal to or next greater than the actual depth of the dive. Follow that row to the right to the bottom time equal to or next greater than the actual bottom time of the dive. Follow that column upward to the repetitive group designation.

Residual Nitrogen Timetable for Repetitive Air Dives

To determine the residual nitrogen time for a repetitive dive, locate the diver's repetitive group designation from his previous dive along the diagonal line above the table. Read horizontally to the interval in which the diver's surface interval lies. The time spent on the surface must be between or equal to the limits of the selected interval.

Next, read vertically downwards to the new repetitive group designation. This designation corresponds to the present quantity of residual nitrogen in the diver's body. Continue downward in this same column to the row which represents the depth of the repetitive dive. The time given at the intersection is the residual nitrogen time, in minutes, to be applied to the repetitive dive.

There is one exception to this table. In some instances, when the repetitive dive is to the same or greater depth than the previous dive, the residual nitrogen time may be longer than the actual bottom time of the previous dive. In this event, add the actual bottom time of the previous dive to the actual bottom time of the repetitive dive to obtain the equivalent single dive time.

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RE345000A

basis for all of the tables we've printed so far in SKIN DIVER. They have just been arranged in yet another way and made more attractive by the addition of color. On the back of the Jeppesen Tables is a Repetitive Dive Memory Jogger — it explains how to use the tables and takes you through the various steps necessary to determine repetitive group designation and Residual Nitrogen Time (RNT) as well as bottom time remaining at any particular depth. You can use an ordinary pencil or a grease pencil to do your calculations on the waterproof version and erase them afterward.

The Jeppesen tables have one feature that other tables we've reproduced did not. The bottom chart has a red line running down it that separates the no decompression RNT's (on the right) from the RNT's that require decompression (on the left). The difference between those times is only a few minutes. Thus, if you are working the tables and find that your RNT is right next to the red line, you should not only thoroughly check your calculations but also increase your surface interval to allow yourself a safety margin.

It seems wise to remind you that the U.S. Navy Tables were developed for U.S. Navy divers who were young, male, in top condition and never far from a decompression chamber. Everyone else is advised to use these tables conservatively. Always allow yourself leeway in both time and depth.

Information on Jeppesen Sanderson materials for dive stores and instructors is available from: Marketing Manager, Sport Diver Products, Jeppesen Sanderson, 55 Inverness Drive East, Englewood, CO 80112. A 22½ by 34½ inch four color poster of the tables is available to instructors for \$2. If you are not an instructor and would like a copy of these tables, your dive store can order them for you from Jeppesen Sanderson. >

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REPETITIVE DIVE TABLES

Release Your Creativity

Move The Lights In Close
For Unlimited Potential

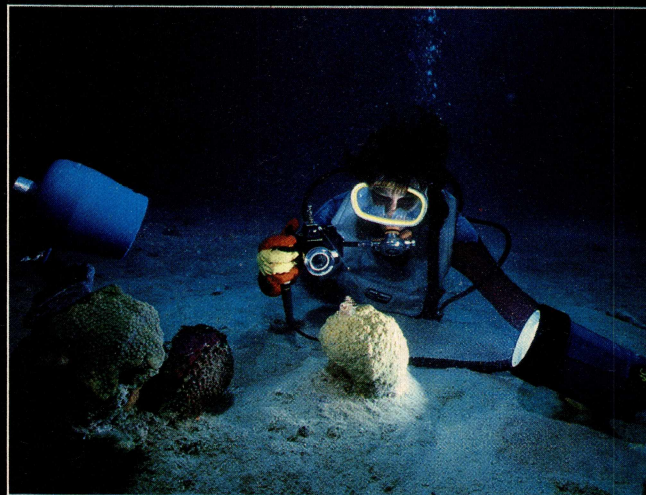
Text and Photography
By Jim and Cathy Church

Close-up lighting is not only exciting and creative, it is also deceptively easy. When you are working close with small subjects, you have greater control for both standard and special lighting techniques. You can document undersea creatures in their environment, or you can use your imagination to create unusual lighting and bright colors that seem to leap out from the screen. If you want to free your creative imagination, close-up lighting has unlimited potential.

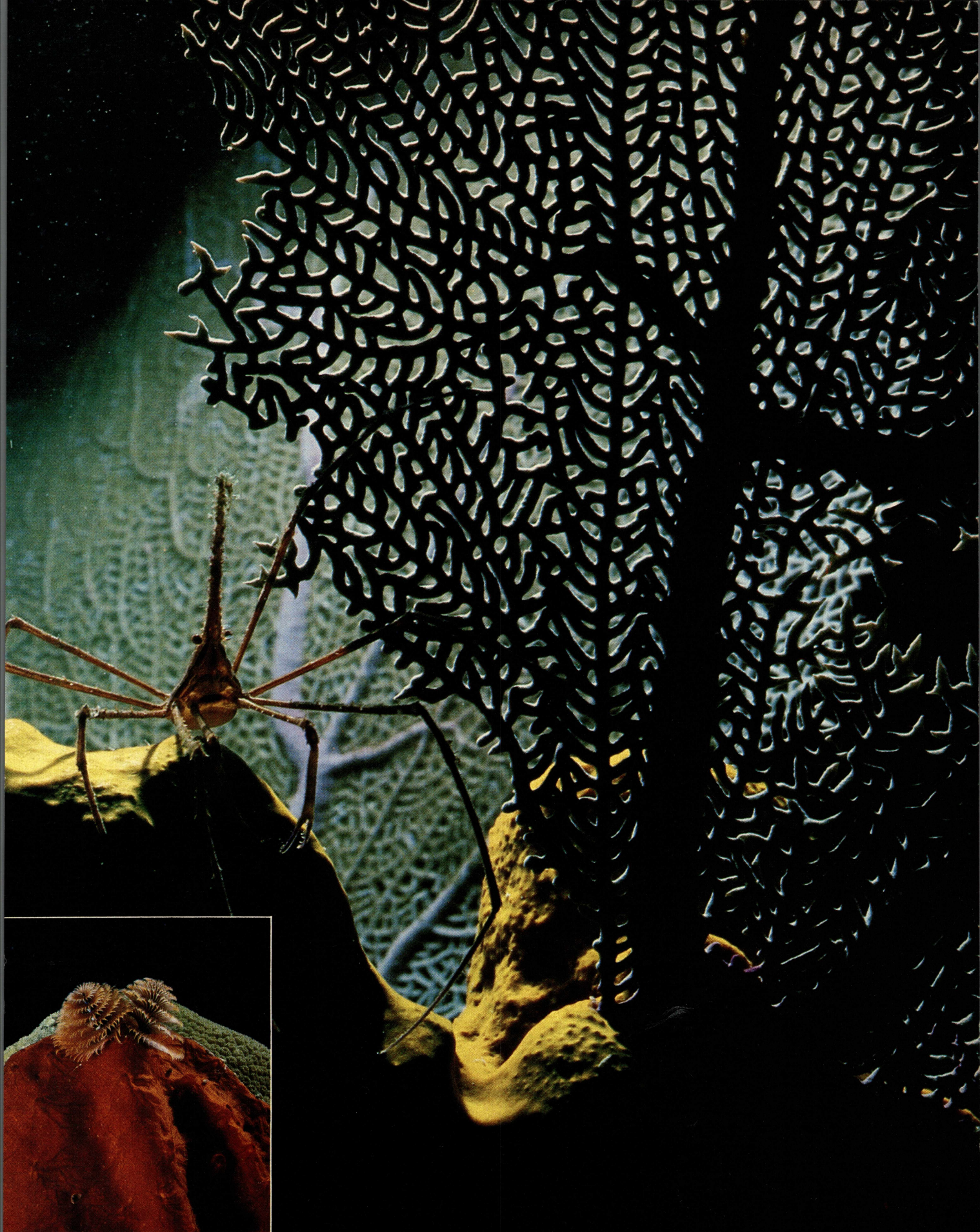
STANDARD LIGHTING

The standard close-up lighting technique for a beginner is to aim the strobe downward and inward, at angles of about 45 degrees, from the upper left side of the camera. In fact, some U/W photographers attach their strobes to the camera in this position with a partially-adjustable or non-adjustable bracket.

Standard lighting offers two important advantages: First, you don't need to make decisions — especially if your strobe is bracketed in place. Second, assuming that you choose subjects of average reflectance, most of your exposures will be correct. To sum up, standard lighting pro-



Two strobe lighting — slave is attached to a lead weight.



Christmas tree worms, from above.

Arrowcrab, backlit, single strobe.

duces a higher percentage of acceptable pictures than creative lighting techniques because standard lighting produces a more predictable result.

Standard lighting, however, has some disadvantages: First, all of your pictures tend to look the same. The highlights are usually in the upper left, and the shadows are at the lower right. This will be most obvious when the pictures are shown in slide show sequences or in multiple print displays. And second, once a beginner learns a simple lighting technique that works, he or she is often afraid to vary that technique, especially when on an expensive dive trip. Thus, creativity peaks out.

CHANGE THE ANGLE

Creative lighting requires a variety of lighting angles. You can use light angled in from the side or top to create highlight and shadow areas to accent contours and ridged textures. Begin with a stationary subject, such as an anemone, sponge or fire coral, and experiment with different lighting angles. See how many different moods you can create by changing the angle.

Don't photograph that hermit crab head on. Photograph him at an angle, with side lighting to illuminate the crab and to accent the opening of his shell home. Experiment with backlighting to outline fine details, such as the hair-like stinging tentacles of fire coral. Backlighting can also give translucent subjects, such as some anemones and jellyfish, a radiant glow. You can sometimes preview the effects of backlighting by shining a bright dive light from behind the subject.

Changing lighting angles, however, can cause problems: First, with a Nikonos, unless your arm and bracketing system is extremely flexible, you usually end up hand-holding your strobe. This occupies your left hand, so you can't use it to brace yourself or steady the camera. With a housed camera, a strobe arm that is easily adjusted for a variety of angles is a must. Second, your percentage of good pictures per roll will probably decrease. The more creative the lighting technique, the higher the odds and stakes you're playing for. You end up keeping fewer pictures, but those you do keep will be much better.

BLOCKING THE BEAM

To a limited extent, when you are using a single strobe, you can combine sidelighting or toplighting techniques with backlighting. It works like this: Aim the strobe from the side or top, and slightly back toward the camera. To prevent the light from striking the lens directly and causing unwanted flare in the picture, partially block the beam with a dive table or cupped hand. This technique works best, of course, if your buddy will hold the

strobe and block the beam for you.

If you work alone, you might consider a rubber hood that fits over the front of your strobe and reduces its beam angle to shield the lens from the strobe. Thus, you can spotlight only those areas that you wish to illuminate.

SUNLIGHT AND STROBE

You can use sunlight as a second light source, even for close-ups. Try using an upward camera angle to backlight your subject with sunlight as you use your strobe to light the near side. This gives a rich, blue background and gives translucent subjects a radiant glow. An exposure meter reading of the background will indicate how bright or dark the background will be in your picture. If you change the aperture to darken or lighten the background, be sure to change the strobe-to-subject distance accordingly.

If, however, the sun behind your subject is providing as much light for the exposure as your strobe, watch out for the blurring effects of camera or subject movement. You can no longer depend on the brief flash duration of the strobe to stop the action — you also have a sunlight exposure for the full shutter speed setting.

REFLECTOR FLASH

Side lighting can cause shadow areas that are too harsh. Thus, a second light source is sometimes needed to lighten the shadows. A simple, inexpensive light source is a reflector that will bounce some strobe light back to the shadow side of the subject. A white diver's slate, held by your buddy, works surprisingly well. The reflector is held beside the subject, on the opposite side from the strobe. Light from the strobe strikes the reflector and bounces back to the shadow side of the subject. Try it, it works!

TWO-STROBE LIGHTING

Once you're hooked on creative lighting, you'll purchase a second strobe. A small, normal-beam strobe with a slave sensor located near the flashtube is best. Sensors located at the side or top may not detect the flash of light from your master strobe. While the second strobe can be attached to the camera system with a simple (often homemade) bracket, having a buddy hold the slave strobe for you is often best. When we shoot close-ups, we usually work as a team with one camera and two strobes.

If you must work alone, don't despair. Attach your slave strobe to a lead weight with a simple bracket. The only adjustment needed is for up and down tilt. Now, you can place the slave strobe in a variety of positions that would often be impossible if the strobe were attached to the camera system.

Having two strobes will more than

double your creativity. You can now work with infinite variations and combinations of lighting from the front, side, top, bottom and back of the subject, as well as creating special effects. You can now photograph a single plume worm with dozens of different techniques and end up with dozens of different pictures.

FILTERED FLASH

You can place colored filters or acetate on one or more strobes to create special color effects. Standard 55 mm filters can be screwed directly into the accessory threads of an SR 2000 strobe (Sonic Research: 5111 Santa Fe, Suite H, San Diego, CA 92109). With the Sea & Sea YS-50 (Sea & Sea, U.S.A., 439 Mola Ave., Ft. Lauderdale, FL 33301), you can place filter gel or acetate in front of the reflector when the strobe casing is unlatched and opened. With the Sunpak Marine 32 (Berkey Marketing Companies, 25-20 Queens Blvd., Woodside, NY 11377), you can place the filter material beneath the accessory diffusion filter that fits over the reflector. With other submersible strobes, attach colored acetate to the front of the strobe with rubber bands.

In our experiments, we've used two strobes with colored acetates over the reflectors — one red, the other green. Extreme side lighting — from opposite sides of the subject, or from top and bottom — produced the best results. The red and green lights would be separated at the sides, but would blend into yellow whenever the two colors overlapped. Generally, frilly subjects or subjects with textured surfaces were best because the red and green could blend into many different shades of yellow.

Because strong filters and acetates can block part of the light from the strobes, try using your ASA 64 exposure guides with ASA 100 or 200 color slide film. If you stay with ASA 64 you may need to open the lens for more exposure, and this reduces your depth of field.

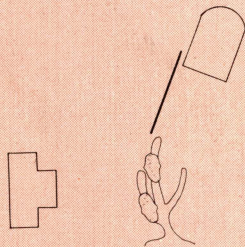
USING COLOR PANELS

Translucent, colored panels can create glowing, colorful backgrounds behind your close-up subjects. All you need are some panels, two strobes and your buddy's help. It works like this: Your buddy holds the color panel behind your subject, and he aims the slave strobe back through the panel toward the subject. For panels, we used 3/16 inch colored Plexiglas, 12 inches square. You could probably use thinner panels as well.

For best results, choose subjects that are out in the open — away from coral or other obstructions that block placement of the panels. Hold the panel about six to eight inches behind the subject, or far enough beyond your close-up depth of field that blemishes on the panel won't be

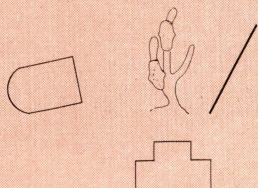
BLOCKING THE BEAM

Aim the strobe slightly back toward the camera, but use a dive slate or cupped hand to shield the camera lens from the beam of light. Although this technique can be used for single strobe lighting, we usually use it for two strobe lighting.



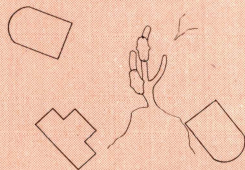
REFLECTOR FLASH

A white slate or dive table can be used as a reflector to bounce strobe light to the shadow side of the subject. Although the reflector can sometimes be propped up, it is easier if your dive partner holds it.



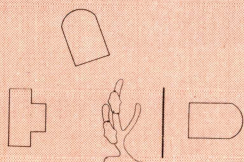
TWO STROBE LIGHTING

With two strobes, you can combine lighting angles such as the front and back lighting shown. The second strobe is usually a slave strobe. It is triggered when its built-in sensor detects the flash of light from the master strobe.



COLOR PANELS

A translucent, colored Plexiglas panel can be used to create glowing, colorful backgrounds. The panel is placed behind the subject, and the slave strobe is aimed back through the panel at the subject.



sharply focused in the picture.

With an extension tube, hold the slave strobe about four to six inches behind the panel. With close-up lenses, hold the slave about 8 to 12 inches away. The closer the slave strobe to the panel, the brighter the background glow behind the subject. Bracket the slave-to-panel distance for your test shots. Hold the master strobe (on the subject side of the panel) at the normal strobe-to-subject distance. But to prevent reflections, hold the master strobe at an angle of 45 degrees or more from the camera.

Generally, the smaller the picture area, the easier it is to use color panels. Start with a Nikonos and extension tube, or with housed camera and macro lens.

LIGHT POINTS OF INTEREST

Ultimately, your lighting should identify and accentuate the main point(s) of interest in your picture. Fancy lighting techniques can defeat the purpose if the lighting draws the viewer's eye away

from the main point of interest. For example, if your subject is a fish facing left to right, and you light from the left side, the tail will be the brightest area. Thus, the viewer's eye is in conflict — it is torn between looking at the brighter tail and the more natural point of interest, the fish's eye. Likewise, if the main point of interest is hidden in a shadow area, the viewer's eye will be drawn away to the brighter highlight areas. As you can see, there is more to lighting than first meets the eye.

CONCLUSIONS

This article has taken you from simple to complex lighting techniques. The techniques you will use will depend on your creative interest, the equipment available to you, the availability of U/W subjects, and often by the amount of help you receive from your diving partner. Just having someone hold your strobe — as you use both hands to steady the camera — can sometimes make or break a picture.

Close-up exposures

Use f16 and f22 whenever possible to maximize the limited close-up depth of field. Remember: The smaller the picture area, the lesser the depth of field.

Standardize with a basic strobe-to-subject distance, aperture and film. When you handhold the strobe, you can bracket exposures by moving the strobe a few inches closer for dark subjects, and a few inches further away for light subjects. If your strobe is bracketed in a fixed position, bracket exposures by changing the aperture. And, for film, standardize with an ASA 64 or slower color slide film. ASA 64 was used in the following discussion.

With a Nikonos, supplementary close-up lens and a strobe having an U/W GN (guide number) of about 18, try an aperture of f16 and a strobe-to-subject distance of one foot. (Note: One quick way to find your GN is to multiply the aperture you normally use for three apparent feet by three. For example, f5.6 x 3 feet = about 18.) If your strobe has an U/W GN of about 24, close the aperture to f22. And for a GN of 30 to 35, set the aperture to f22 and move the strobe back to 1.5 feet.

With a Nikonos and extension tube, set the aperture for f22. With an U/W GN of about 18, the strobe-to-subject distance will be about three to six inches with a 1:1 tube, four to eight inches with a 1:2 tube, and five to nine inches with a 1:3 tube. With an U/W GN of about 24, the strobe-to-subject distance will be about four to eight inches with a 1:1 tube, 6 to 12 inches with a 1:2 tube, and 7 to 13 inches

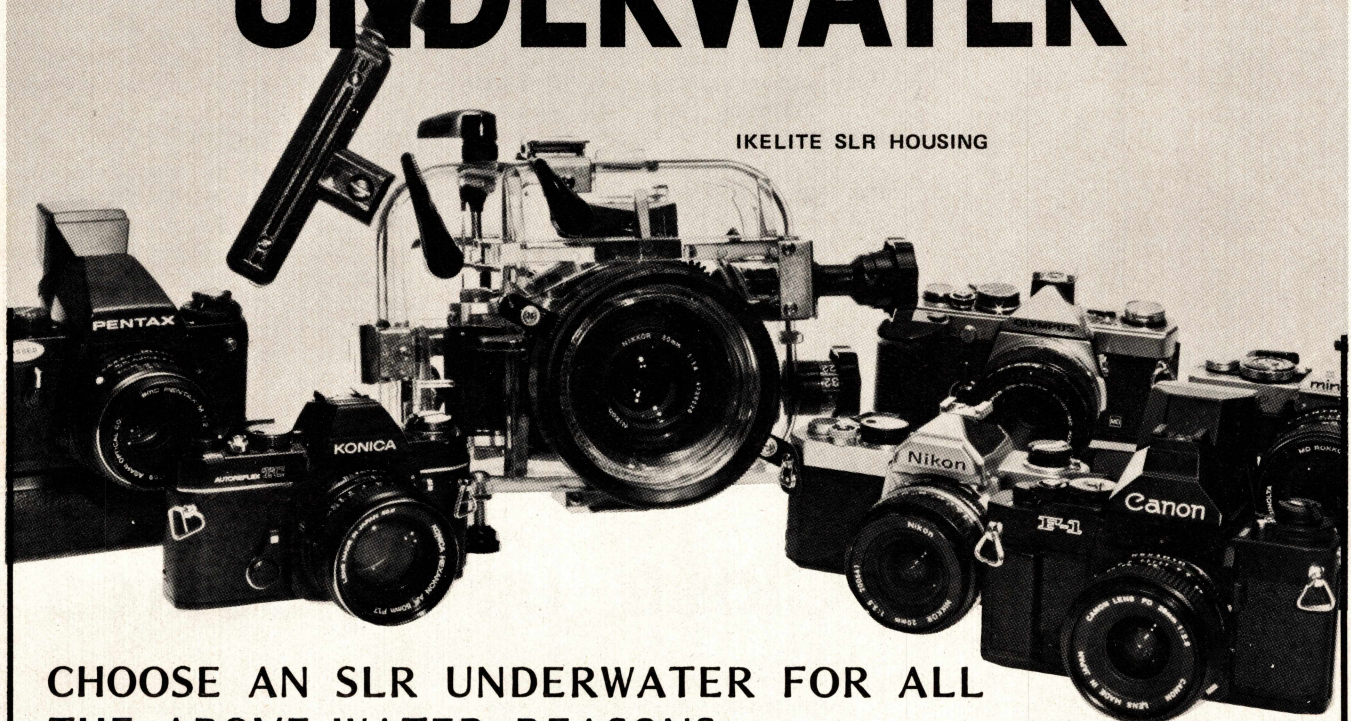
with a 1:3 tube. And with an U/W GN of about 30 to 35, the strobe-to-subject distance will be about 6 to 12 inches with a 1:1 tube, 8 to 16 inches with a 1:2 tube, and 10 to 20 inches with a 1:3 tube.

Bracket extension tube exposures by moving the strobe to the near limit of the distance range for dark subjects, to the middle for average subjects, and to the far limit for light subjects. Use camera parts for visual references to judge distances. For example, holding the flash head to the rim of the lens, back by the control knobs, and back to or behind the camera body.

With a housed camera, experiment by bracketing from f11 to your highest-numbered aperture to find which aperture is best for average subjects. Once determined, you usually don't have to change this aperture when you make small changes in strobe-to-subject distance (changes which occur when you move the camera closer to, and further from the subject, while focusing). Apparently, the effect of changing the strobe-to-subject distance is offset by the bellows factor of a close-focusing (micro or macro) lens at close-up distances.

If you use a second light source that is weaker than your main strobe — such as a dive light for focusing, reflector or second strobe — base your exposure on the main strobe only. You can ignore the effect of the weaker light source. If, however, two strobes are illuminating the same subject area with equal intensity, use one stop less exposure.

TAKE THE BEST UNDERWATER



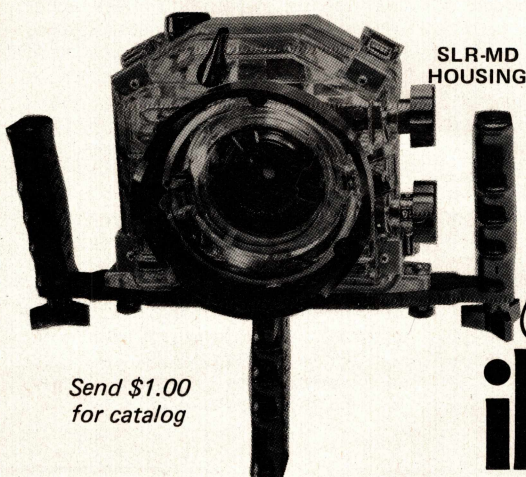
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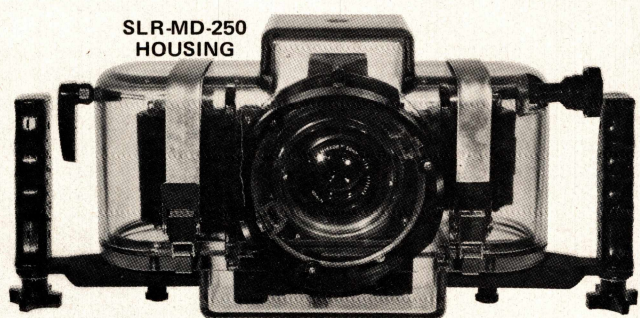
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Meter Behind The Lens
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Approximate Neutral Buoyancy
Wide Angle Lenses
Macro Lenses
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Motor Drive Film Advance
250 Exposure Capability

SLR
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Yes
Yes
Yes
Yes
Yes
Yes
Yes
Yes
Yes
Yes
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DEALER INQUIRIES INVITED

Scuba Quiz

Category: Currents

By Dennis Graver

The power of water in motion is great. To oppose it is futile. For safe diving, we must understand why water moves, how it moves, and how its movement can be used to advantage. The following questions are to test your knowledge of currents and their effects upon divers. Answers are on the following page.

1. The primary cause of currents in large bodies of water is:

- ☐ A. Waves
- ☐ B. Tides
- ☐ C. Wind
- ☐ D. Bottom formations

2. The major ocean currents circulate:

- ☐ A. Clockwise in the northern hemisphere and counterclockwise in the southern hemisphere
- ☐ B. Counterclockwise in the northern hemisphere and clockwise in the southern hemisphere
- ☐ C. Clockwise in both the northern and southern hemispheres
- ☐ D. Counterclockwise in both the northern and southern hemispheres

3. Which of the following will reduce the strength of a current in water:

- ☐ A. Depth
- ☐ B. Bottom formations
- ☐ C. A thermocline
- ☐ D. All of the above
- ☐ E. None of the above

4. Currents running close to and parallel to the shoreline along a straight, open coast are most likely to be generated by:

- ☐ A. Wind
- ☐ B. Waves
- ☐ C. Bottom formations
- ☐ D. Tides
- ☐ E. None of the above

5. A strong current flowing perpendicular to the shore on an open coast would most likely be generated by:

- ☐ A. Wind
- ☐ B. Waves
- ☐ C. Tides
- ☐ D. Convection

6. When water is set in motion by the wind in an open area, the resultant surface current flows:

- ☐ A. In the same direction as the wind
- ☐ B. At an angle of 45 degrees from the wind direction
- ☐ C. At an angle of 90 degrees from the wind direction
- ☐ D. In the opposite direction of the wind
- ☐ E. There is no consistent pattern for current direction

7. Which of the following statements is false:

- ☐ A. Begin dives against the current when diving from an anchored boat
- ☐ B. The direction of water movement beneath the surface is consistent with the direction of movement at the surface
- ☐ C. A diver cannot make sustained headway against a current of only one knot
- ☐ D. The current is greatest on the outside of a bend in a river

8. Which of the following statements is true:

- ☐ A. Currents flow within the Great Lakes due to differences in water levels between the lakes
- ☐ B. One can expect a significant reduction in current flow below a thermocline
- ☐ C. Spiraling currents are usually encountered along the banks of rivers
- ☐ D. All of the above
- ☐ E. None of the above

9. If caught unexpectedly downstream in a current while diving, you should first:

- ☐ A. Get buoyant, signal for assistance, and wait for aid
- ☐ B. Swim to shore if nearby, and walk to destination
- ☐ C. Swim across the current, trying to get clear of it
- ☐ D. Return upstream on the bottom if air is available
- ☐ E. None of the above

10. A strong current flowing through a narrow opening on an open coast can result from:

- ☐ A. Tidal changes
- ☐ B. Wave action
- ☐ C. Bottom formations
- ☐ D. Man-made structures
- ☐ E. All of the above

Scuba Quiz

Answers: Currents

1. C. Wind. The waters of the earth are set into motion primarily by winds blowing across them. Some motion is also produced by convection. The waters at the equator receive more heat (sunlight) than the waters of the poles, and this causes circulation by convection to the colder waters at the earth's poles. Tidal currents, unless increased in intensity by flowing through a narrow passage, are not as significant as wind-generated currents.

2. A. Clockwise in the northern hemisphere and counterclockwise in the southern hemisphere. Due to the direction of steady winds and the rotation of the earth, the currents flow as just described. This can be noted even in the drain of a basin. The major ocean currents seldom affect divers directly, but they do control the water temperature and affect coastal area climates significantly.

3. D. All of the above. The speed of a wind-driven current decreases exponentially with depth. A current is weakest near the bottom where obstructions cause resistance to flow. Current is decreased at a thermocline, which acts as a "slippery" surface upon which a current can flow. Knowledge such as this increases safety when diving in areas where currents are typically encountered.

4. B. Waves. As waves approach a shore at an angle, they push water along the shoreline. This longshore current seldom exceeds one knot, but must be taken into consideration when entering and exiting from shore in some areas. Steep, straight beaches have the most prevalent longshore currents.

5. B. Waves. A strong, offshore current on an open coast suggests a rip current, caused by water piled on shore and being funneled back to sea through a narrow passage. Whether caused by surf breaking over an obstruction, fed by a longshore current, or a combination of the two, rips are hazardous and one must be able to identify them. To escape a rip current, swim parallel to shore until you are clear of the narrow flow of water, then make your exit.

6. B. At an angle of 45 degrees from the wind direction. According to Ekman, a noted oceanographer, water at the surface moves at an angle of 45 degrees (measured clockwise in the northern hemisphere and counterclockwise in the southern hemisphere) to the direction of the wind. The angle of the water flow to the wind increases steadily and linearly with depth until, theoretically, the current should flow directly opposite that of the wind which generated the flow. Because current speed decreases rapidly with depth, however, divers are most concerned about the direction of the flow at the surface.

7. B. The direction of water movement beneath the surface is not always consistent with the direction of movement at the surface. One aspect of this was just discussed in the previous answer. Another situation is where a strong wind has reversed the flow of surface waters while those beneath continue to flow in a different — even opposite — direction. Currents can also flow in different directions above and below a thermocline. It is important to orient yourself to current direction both at the surface and on the bottom and to plan your dive accordingly.

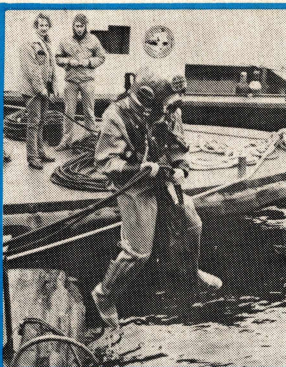
8. D. All of the above. The more you dive in moving water, the more you need to know about it. Large current changes at thermoclines have already been mentioned twice. Major currents do flow in the Great Lakes. Perhaps the areas of most treacherous currents, rivers pose unique water movement problems. Whirlpools, downward flowing currents, sucking hole currents and spiraling shore currents can panic an unsuspecting, uneducated diver. Always get an orientation to a new dive situation.

9. D. Return upstream on the bottom if air is available. All of the answers are correct, but the preferred action to take first is to return to the exit area by the most direct route and without disrupting others. The current will be weakest or perhaps even negligible next to the bottom, so progress can usually be made against it there when a similar attempt at the surface would be foolish. The other options are listed in the reverse order of preference.

10. E. All of the above. As tidal waters flow in and out of inlets, narrow passages funnel vast quantities of water and velocities similar to river currents can result. Waves and bottom formations cause rip currents, which do not necessarily always occur in the same places. Man-made structures, such as piers and jetties, divert water flow and can be responsible for strong currents in certain areas. It is important to find out all you can about water movement in an unknown area before diving there.

Have you ever been surprised and frightened by a current and its strength while diving? I have, and it takes the enjoyment out of the activity. Currents are only one item we need to take into consideration when diving in a new locality. When we learn to dive, we become qualified to dive only in the area in which we were trained. If you relocate to a new geographical area, consider participating in the training dives there.

MAN IN THE SEA



ARE YOU READY FOR THE CHALLENGE?

"Our destiny is linked to the fate of the oceans, and, ironically, we will determine the future of the sea through our actions in the next few decades," declares Dr. Sylvia Earle, who on September 19, 1979, walked on the sea floor, 1,250 feet below, for two and one-half hours. Dr. Earle's statement supports the continuing need for qualified commercial divers. Your entry into the world of deep sea diving will be a most prestigious and rewarding career. *Well-trained divers are in demand not only in the oil industry, but also in underwater salvage, construction, farming and environmental awareness.* Your first step to employment as a commercial diver is superior training.

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Divers Institute of Technology developed a six-month course that set an industry standard. Training is based on a highly sophisticated deep sea diving program that prepares you both mentally and physically to enter this new environment. DIT's curriculum has been designed to prepare you for gainful employment in all

fields of commercial diving, *not only in the oil industry.* Some of the fields DIT graduates are currently working in include salvage and repair, inspection, aquaculture, scientific data research and the offshore oil industry. Classroom instruction deals in facts and theory. Open water instruction gives you the practical application of classroom techniques. *The culmination of your training is actual dives to depths of 200 feet. To our knowledge, we are the only commercial diving school that puts you to this test. The confidence gained from this experience is unequalled.* Before you decide which school to attend, check this point out. Many schools provide only simulated deep dives in recompression chambers and diving tanks on dry land.

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tion is located on the Lake Washington ship canal where water is murky and the visibility is poor; the type of environment you will be exposed to in the field. The equipment used in training is also what you will find in the field. Of the nearly 6 billion acres of continental shelf in the world, 78% has yet to be explored. Investigate DIT now . . . judge for yourself who's best qualified to train you right!

Send \$2.00 (U.S. currency only) for our catalog. It contains full disclosures, including course outline, employment statistics, instructor qualifications, tuition refund policy, standards of progress, financial assistance available, student loan policy, grants, placement assistance, etc.

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HEALEY TO HARVEY'S

Maureen Healey has been appointed East Coast division director of sales for Harvey's Custom Suits, watersports wear and fashions. Along with sales and promotional activities, Healey will contribute ideas for new fashions to be incorporated in the Harvey line.

Harvey is continuing to recruit sales force personnel on a market by market basis. Healey will accept applications at: Harvey's Custom Suits, Inc., East Coast Division Sales and Service Office, Simoneau Plaza, 300 Main Street, Nashua, New Hampshire 03060, (603) 882-6748. Harvey will accept applications at: Harvey's Custom Suits, Inc., 2505 South 252nd Street, Kent, Washington 98031, (206) 824-1114.

DIVE MUSEUM

The Institute of Diving opened its International Diving Museum in Panama City, Florida in March.

Major exhibits include SeaLab I, salvaged and restored after ten years at the bottom of the Gulf of Mexico, the MK I Deep Saturation Dive System and the Trieste Pressure Sphere.

For additional information please contact the Institute of Diving, P.O. Box 876, Panama City, Florida 32041.

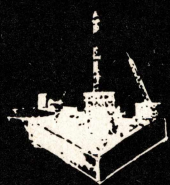
WANTED: YOUR PICTURE

Diving Unlimited International (DUI), a San Diego dive equipment company, is looking for pictures of divers using DUI products. DUI equipment is used all over the world, from the astronaut splash-down recovery teams to the recent salvaging of the *Andrea Doria*. Send pictures of divers wearing or using DUI equipment, with a few words of description and a letter approving of DUI's use of your name, quotes and pictures. Because of logistics, it is impossible for DUI to return any materials sent. If your pictures are used, DUI will pay you \$250 or \$500 worth of DUI diving equipment of your choice. Mail photos to: DUI, 1148 Delevan Drive, San Diego, California 92102. This offer expires June 1.

SOUTHBOUND DIVING

Southbound Diving Charters, Garden Cove Marina, Key Largo, Florida has a new 31 foot diesel boat, custom designed for six divers. Southbound offers half and full day charters to John Pennekamp Coral Reef State Park. All dives include the use of an underwater camera with strobe.

For more information and color brochure, including rates and dive packages contact: Capt. John L. Wallace, Southbound Diving Charters Inc., P.O. Box 637, Key Largo, Florida 33037; (305) 451-1407.



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A Perfect Pair

If you glance through the Heuer 1982 Specialty Collection catalog you'll see a wide variety of attractive, Swiss-made dive watches for men and women. Behind each Heuer watch is a company that has been in the business of manufacturing quality timepieces for over 120 years. Over that period it has compiled a list of impressive accomplishments that includes being the official time keeper at both the summer and winter Olympic Games in 1980.

Heuer watches come in various colors and sizes, with various functions, and with quartz or automatic movements. Two of these are the models 980.020 and 980.018. The model 980.018 is the woman's version of the 980.020. It has a three-eighths inch smaller diameter dial face and a narrower bracelet.

The 980.020 combines rugged structure with good looks. The case, bezel and bracelet are made of stainless steel. The crown, bezel trim, and accent stripes on the bracelet are gold plated. The watch is built to stand the rigors of diving but is elegant enough for dress wear.

The 980.020 contains a quartz movement. Electrical power from a small battery energizes a circuit containing an oscillator. The high frequency vibrations from the oscillator are translated by a tiny quartz crystal into a very stable frequency and these oscillations are in turn translated into movement of the hands. The stable vibration frequency of the quartz crystal gives the watch its accuracy (plus or minus two minutes per year). Quartz watches have fewer moving parts than spring-powered watches — fewer parts to wear out.

The movement is secured inside a sturdy, O-ring sealed case that is warranted to 660 feet. As protection against scratches, the hard, mineral glass crystal is slightly recessed inside the bezel. As protection against bumps and bangs, the crown is nestled between two built-up shoulders of the watch case. The watch crown screws in to make a watertight seal. The bezel has a knurled edge and high profile for easy gripping

Elegant, accurate Heuers can take the rigors of diving

By Jim Walker

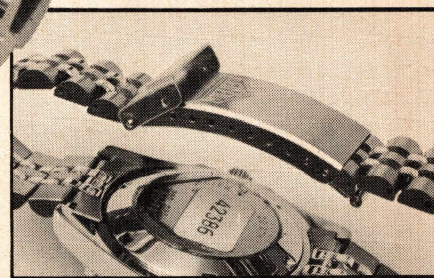
with gloved hands. Its one-way ratchet has definite click stops.

The face of the watch and of the bezel are gray-black. The hands and hour positions have distinctive shapes and a luminous coating for easy reading in low light. In semi-darkness, the second hand is visible as a small moving dot, the minute hand as a thin line, and the hour hand as a short pointer with a large disc near the end.

If you've ever had a watch bracelet snap open unexpectedly, you'll appreciate the special locking feature of this band. When the main clasp is snapped closed, a small secondary clasp can be snapped down over the tip of it to prevent accidental opening.

Care of this watch, as with any quality instrument, should include thorough freshwater rinsing after use in the ocean.

The battery life of the man's model is



A double clasp secures the watch bracelet.

rated at over two years and the woman's model over one year. Both models come with a one year limited warranty that is valid at Heuer dealers worldwide.

Should the watch require service or battery replacement, simply present it to a dealer or ship it to Heuer Time & Electronics Corp., 960 South Springfield Avenue, Springfield, NJ 07081.

Both models (980.020 and 980.018) are available at dive shops for \$345. For dealer information or a free brochure, write to the above address.

California's Charisma & Conception

**Crown Jewels of the
Charter Dive Boat Fleet**

**Text and Photography
by Bonnie J-Cardone**

Loran C and two fathometers. A flying bridge makes maneuvering and anchoring more accurate and easier.

The *Charisma* is 78 feet long and 25 feet wide. In addition to her six staterooms, she has two carpeted bunkrooms and can sleep 54 people. Her bunks have blankets, pillows and pillowcases. The staterooms have both a single and a double bunk as well as a 110 volt outlet. If you don't have a stateroom, you will still be able to recharge your underwater strobes and lights because there are 110 volt outlets throughout the boat.

The *Charisma's* galley is large and comfortable, with vinyl upholstered booths. Although you must remove your booties, wet wetsuited divers are welcome. There is a sundeck above the main deck. Up there, you can sit out a dive or catch a few rays on the way home. The *Charisma* is one of the few dive boats on which a non-diving spouse or friend will be comfortable. It never seems crowded and you can always find a quiet spot to relax.

The two compressors mean you never have to wait for air. Leave your tank at the fill station as you climb on board after a dive: It will be filled and secured to the railing by a crew member.

The *Charisma* was built for outer island and multi-day trips. Although she occasionally runs to Catalina, more often her destinations include the more distant Southern Channel Islands — San Clemente, San Nicholas, Santa Barbara — as well as Begg Rock and Cortes Bank. Some of these trips take as long as eight hours — one way. The *Charisma's* comfortable bunks and galley, color TV and steak dinners help these hours pass quickly and pleasantly.

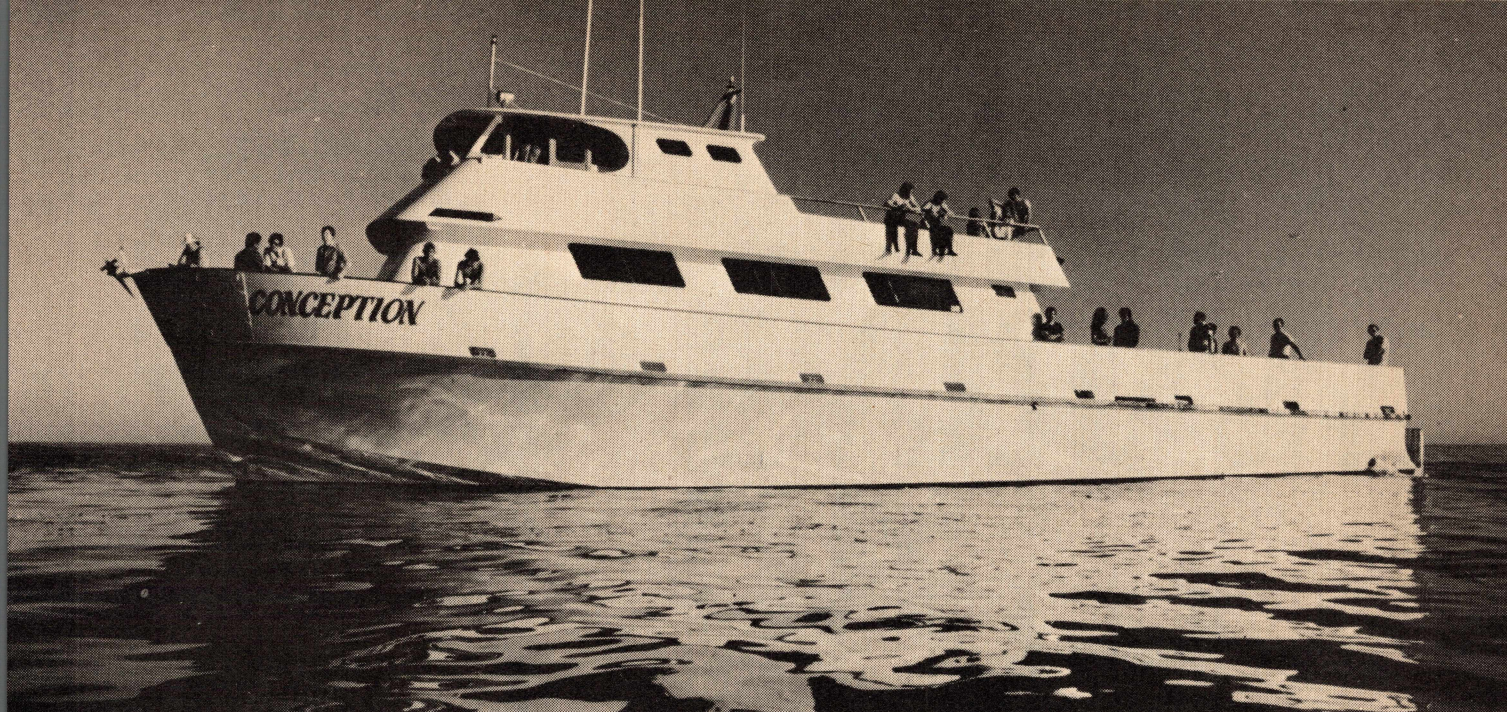
On multi-day trips there is a walk-in freezer and a refrigerator available to store divers' game.

A dive boat is only as good as its captains, however, and the *Charisma* has two veterans. Roger Hess was scuba certified almost 30 years ago, in 1953. He became an L.A. County instructor in 1955. He has owned and operated five dive boats since 1959. The *Charisma* is the first one he has built, but before her there were the *Blue Fin*, the *Long Fin*, the *Maverick* and the *Toronado*. One of the most respected dive boat skippers in the business, Roger appeared in *SDM* pages in November 1962 in the Personality Spotlight.

Roger's son, Ken, grew up on dive boats. He obtained his scuba certification at the age of 14 and at 18 was one of the youngest licensed captains on the West Coast. The Hess' alternate running the boat and one of them is always on board, but there are other crew members who are licensed skippers as well.

The *Charisma* runs weekdays as well as weekends, and has some open boat trips. Most of her trips are chartered by dive clubs and stores. To charter the boat for your group call: (213) 326-7460. To make a reservation on an open boat call 22nd Street Landing, (213) 832-8304. To book a spot on a chartered trip you must call the chartering organization. The *Charisma* prints a two-month calendar with her charters, their phone numbers and destinations. You may obtain one by sending a stamped, self-addressed envelope to: Roger Hess, 26302 Senator Avenue, Harbor City, CA 90710.

The *Charisma* was The Crown Jewel of California's dive boat fleet for almost two years. She was, without a doubt, the



most modern and comfortable dive boat on the West Coast. Then, last July, the *Conception* was launched. Now the fleet has two crown jewels.

The *Conception*, docked at Sea Landing Breakwater in Santa Barbara, is owned and captained by Roy Hauser and Glenn Fritzler. This is the third dive boat Roy has owned and the second one he has built. The first boat he built, the eight year old *Truth*, is docked next to the *Conception* and is still a modern, comfortable dive boat.

Glenn, who helped build the *Truth* and was a deckhand on her for five years, formed a partnership with Roy in 1979.

There are no big differences between the *Charisma* and the *Conception*. The differences lie in details that reflect the tastes of the owners. The boats are about the same size: The *Conception* is 75 feet long and 25 feet wide. She can carry up to 49 divers. She also was built with multi-day, outer island trips in mind. Her destinations include the Northern Channel Islands: Anacapa, Santa Cruz, Santa Rosa and San Miguel. Hauser and Fritzler have added certain things to make her more comfortable on these longer trips.

Although the *Conception* has no state-rooms, all of her bunks have curtains for privacy and contain reading lights that swivel. Blankets, pillows and pillowcases are provided. The single bunks have a little shelf at the foot, and the double bunks a shelf on one side, for all of those little things you used to have to stuff under your pillow: paperback books, suntan lotion, etc. There are small cubicles for storage as well as storage areas under the bunks. The bunkroom is carpeted and has fans to keep the air circulating.

Below deck there are two clothes dry-

ers; a crew member gathers towels at night and dries them for you. Also below deck is an area with racks and plastic hangers so you can hang your wetsuit up to dry overnight. There is plenty of freezer space to store game caught on multi-day trips. Underwater photographers will find more than ample space in the galley for assembling photo gear and there are 110 volt outlets so that U/W lights and strobes can be charged.

In place of a forward bunkroom there is a shower room with two hot showers, a sink and mirror and two dressing rooms. There are three heads and two outside hot showers on the main deck. A sun-deck, above the main deck, has comfortable cushions for the benches.

Multi-day trips include food and air and on the *Conception* you will have plenty of both. Two compressors fill four tanks at a time. The spacious galley is lined with upholstered benches, tables and stools. In between dives the galley provides soft drinks, fruit, cookies and other munchies. Galley cooks (one of them is Jenny, Roy's wife) turn out incredible gourmet meals. We had fluffy, tasty omeletes for breakfast and stuffed chicken rolls for dinner.

Diving is made easier on the *Conception* in a number of ways. There are boxes at the two gates so you can rinse your mask just before you jump in. The dive platform has hatches filled with salt water in which your game stays fresh and lively. You are welcome in the galley even if you are dripping wet. The crew members are extremely helpful and always courteous.

The *Conception* also has the latest equipment including: radar, auto pilot, Loran C and two depth finders. One of these depth finders has an extension on

the main deck which tells divers how deep the water is under the boat. The *Conception* also has a flying bridge.

The *Conception's* owners are also seasoned divers and skippers. Roy was certified in 1956 and received his skipper's license in 1966 when he was 21. A man of seemingly boundless energy, Roy helped build the *Conception*; skippers both the *Conception* and the *Truth*; and has continued to be involved in many activities despite a residual paralysis caused by a dive accident three years ago. Glenn received his C-card in 1971 and his skipper's license in 1979. Both of these men have had considerable experience diving and running boats in California waters: They grew up on the Pacific Ocean.

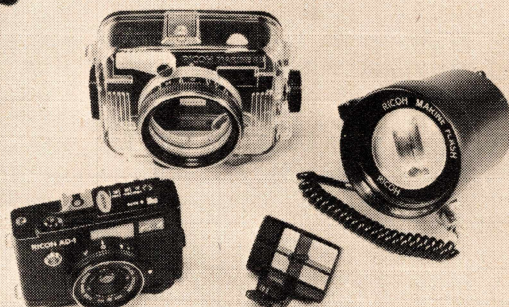
The *Conception* runs weekdays and weekends and has open boat trips although she is usually chartered. To get on an open boat or for general information, call: (805) 962-1127. To charter the boat for your group call: (805) 965-7543. A two-month calendar for both the *Truth* and the *Conception* is available from Truth Aquatics, Inc., Sea Landing Breakwater, Santa Barbara, CA 93109.

Luckily, California has room for two crown jewels and the two boats are not really rivals. The *Charisma* is chartered mostly by Southern Californians while the *Conception's* clientele comes from Central and Northern California as well as out of state. And, although only about 90 miles separate San Pedro and Santa Barbara, the diving is different. The Northern Channel Islands are surrounded by slightly colder, and often rougher, waters but are richer in marine life and game. The waters around the Southern Channel Islands are warmer and calmer. >>>

RICOH MARINE AD



A unique pocket
camera in a
compact U/W
housing



Ricoh's underwater camera system is composed of an injection molded ABS plastic housing, auto exposure camera, submersible strobe and special sportfinder.

Ricoh Company of Japan has recently introduced a compact underwater housing and camera for divers seeking an inexpensive, easy-to-use 35 mm photographic system. One of the company's top pocket cameras forms the heart of the system, and a tough little injection molded housing transports the camera underwater. The system is called the Ricoh Marine AD: Marine, for underwater and AD, for Automatic exposure and Date setting mechanism. The greatest advantage of this particular system is its simplified controls for uncomplicated operation.

One of Japan's well established camera manufacturing firms, Ricoh has expanded into the fields of word processing equipment, office copying

machines, data retrieval equipment and so on. Ricoh made its first 35 mm camera in 1938 and has been cranking them out ever since. Today, Ricoh produces an impressive line of seven different 35 mm SLR's and six different viewfinder cameras. One of the company's newest photographic achievements is the XR-S, the first solar battery powered 35 mm SLR camera. This same innovative technology has been put into Ricoh's underwater camera development program, resulting in the Marine AD.

THE CAMERA

The heart of Ricoh's underwater system is an extraordinary little pocket camera called the AD-1. Constructed of high impact space age plastic, with metal in-

ternal parts, this camera is extremely light — it weighs only 14 ounces. It is truly a compact camera; four and one-half inches long, three and one-half inches high, and two inches thick. It will slip into almost any jacket pocket for convenient carrying, and can be stored in a minimum amount of space.

The camera's exterior is mostly coated with a textured rubber for better grip and scratch resistance. The AD-1 has a large hinged door on the back for loading film. The interior of the camera's film transport area is also plastic, thus reducing the possibility of rust or salt corrosion should water accidentally spill into it during film loading.

The AD-1 features a built-in auto-winder. As you rotate the winding knob

counterclockwise, a green indicator on the bottom of the camera fills a semi-circular slot on the winder knob. Fully wound, the power drive spring will fire 10 to 12 shots, automatically advancing the film and re-cocking the shutter. All you have to do is push the shutter release button on the top of the camera body. A selector button on the front of the camera allows the option of single frame shooting (S) or continuous frame shooting (C) at the rate of two frames per second. The autowinder is a mechanical device which requires no batteries.

Still another novel feature of the AD-1 is a built-in date setting device. At the top of the camera, on the left side is a date selector. It has three sets of numbers for the year, the month and the day (82-12-19 would represent December 19, 1982). The numbers can be adjusted quickly with knurled dials. A yellow slide above the date windows activates the setter when switched to Date. The date is automatically imprinted on the lower

green bull's-eye for seven feet, and a mountain peak for infinity. On the bottom edge of the focusing ring, the distance scale is marked in both meters and feet for more precise adjustment. The front of the lens barrel is threaded to accept a 46 mm filter or close-up lens adapter.

The AD-1 has a fully programmed leaf shutter which automatically adjusts the shutter speed and aperture for ambient light. It has a wide range of exposure capability going from 1/30 second at f2.8 to 1/250 second at f22. A CdS exposure meter mounted just above the lens pupil senses the incoming light and automatically selects the optimum combination of shutter speed and aperture for best exposure. This exposure meter system is also interlocked with the manual strobe flash. A notched selector ring on the face of the lens dials the ASA setting which appears in a small window just below the lens pupil. There are 12 different film speeds ranging from ASA 25 to ASA 400.

The viewfinder on the AD-1 is a range-

only two controls necessary for operation — the zone focusing ring and the shutter release button. Best of all, the AD-1's suggested retail price is \$210. Incidentally, the Ricoh A-2 will also fit the new underwater housing as it is identical to the AD-1 except for the AD's date setter. The list price for the A-2 is \$203.

UNDERWATER HOUSING

The Ricoh Marine AD is an amazingly compact underwater housing not much larger than the camera itself. It is approximately six inches in length, five inches tall and three inches thick. The housing is constructed of extremely rugged injection molded ABS plastic that is both shatterproof and very lightweight. The entire housing weighs only 17 ounces out of the water.

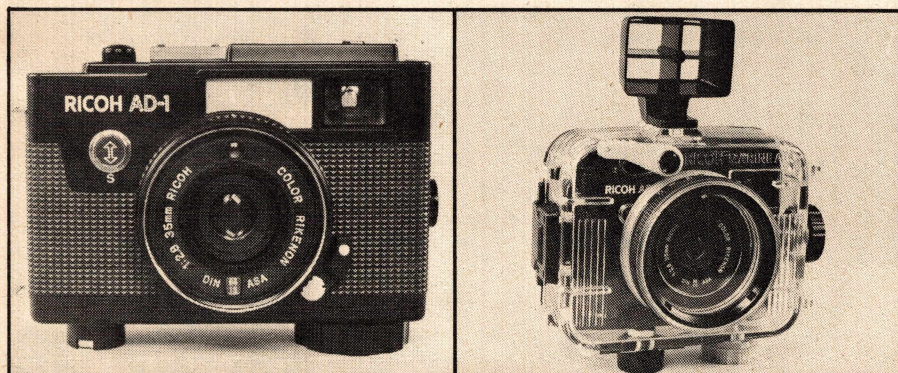
The housing is designed in two major parts which are sealed by an O-ring. The main part of the housing is clear plastic so that the camera contained inside can be seen by the diver. This portion of the housing has the shutter release lever on the front, the autowinder knob on the bottom and the flash cord connector plug also on the bottom. In addition, there is a tripod mounting screw on the left side of the housing to hold the camera snugly in place. All four of these through-wall controls and fittings are metal with O-ring seals.

Mounted on the front of the housing is a three inch diameter lens port fitted with flat optical glass. The entire lens port rotates on an O-ring seal and serves as an underwater focusing control for the camera lens. A small plastic collar is pressed over the camera lens and a quarter-inch wide notch (keyway) on it mates with a similar rib on the inside of the lens port. The camera can be slipped into the housing easily by lining up the notch on the lens collar with the rib on the port.

The rear portion of the housing is a solid black ABS plastic door mounted on a hinge. The door is heavily ribbed and contour molded for extra strength. According to the manufacturer, the housing is test rated to 98 feet. The door is sealed by a large four inch by five inch O-ring, fitted into a groove on the edge of the door. The door can be quickly opened and shut by a simple plastic latch equipped with a spring-loaded locking snap. The door allows quick access to the interior of the camera housing for easy insertion or removal of the camera.

The rear door of the housing has a three-quarters inch diameter clear plastic viewport for observing the camera's viewfinder and exposure meter underwater. The diver can clearly see either the yellow or red dot. There is also a large threaded screw directly in the center of the rear door which allows for equalizing air pressure inside the hous-

Text and Photography by Geri Murphy



The Ricoh AD-1 camera features a 35 mm f2.8 Rikenon lens with a programmed leaf shutter for totally automatic exposure. The Marine AD housing has an optical glass lens port. Most of the housing is clear to allow viewing of the camera inside.

right corner of the picture negative or color slide. You can date the first frame of a roll for future reference, date selected frames, or date every picture on the roll by leaving the switch on. The numerals appear on the film in white.

The AD-1 is equipped with a built-in, fix-mounted 35 mm f2.8 Color Rikenon lens. It is a high quality four-element optical glass lens similar to the quality lenses used in the Ricoh SLR cameras. The lens barrel is molded right into the front of the camera body for compactness and durability. There is a ring on the front edge of the barrel which features a simplified zone focusing system. The distance scale on the top edge of the ring has four basic symbols: A single white dot for 3.3 feet; a head and shoulders for four feet; a

finder type which gives a bright image and shows 83 percent of the actual picture area being photographed. In addition, the viewfinder also contains an automatic exposure meter indicator. A yellow dot appears in the viewfinder when there is sufficient light for exposure. A red dot replaces the yellow dot when the light level is insufficient. When a battery check (B.C.) button on the back of the camera is pushed, a red D appears in the lower right corner of the viewfinder, indicating the batteries have power and are working properly. The AD-1's automatic exposure system is powered by two 1.5 volt silver oxide batteries (Duracell MS76 or Eveready EPX76).

Once the AD-1 is loaded with film and the autowinder fully wound, there are

ing during travel. This pressure relief valve is extremely handy for avoiding vacuum lock situations.

A small two inch wide underwater sportfinder comes with the housing and screws onto the top by means of a small plastic anchor screw. The plastic sportfinder provides quick framing of underwater subjects during action sequences. There are also threaded screw mounting holes on the bottom of the housing for the underwater flash bracket. Last but not least, the housing features four molded eyelets for mounting a housing neckstrap which comes with the unit.

Listed retail price for the Marine AD Underwater Housing is \$162.50. The total cost for the pocket camera and housing is \$372.50, an attractive price for a 35 mm underwater camera with motor drive, automatic exposure and a date setter.

THE FLASH

The Ricoh Marine Flash is a compact submersible strobe with fairly high quality performance. Although it bears the Ricoh name, this unit has the familiar shape and features of the Toshiba TM-1, a proven underwater strobe that has been around for several years. The Ricoh version however, does feature a number of distinctive modifications, including a new type of flash arm and bracket assembly, plus a special bulkhead connector for the flash cord.

The Ricoh Marine Flash is constructed of an injection molded, high impact plastic which makes it very lightweight. With the bracket and batteries, it weighs two and one-half pounds. The flash head is five inches long and three and three-quarter inches in diameter and features a rotating knob at the base of the strobe head for adjusting the flash angle.

This strobe is powered by four AA alkaline batteries that are loaded into a compartment in the rear of the strobe head. A fresh set of batteries will provide 150 to 180 flashes, depending upon how long the strobe is left on between shots. A ready light on the rear of the strobe head, just above the battery compartment, indicates the flash is fully up to power and ready to fire. Recycle time between shots can range from 7 to 15 seconds depending on the power level of the batteries.

The underwater beam angle of the Ricoh flash is 60 degrees diagonal, more than adequate for the AD-1 camera. The flash features a straight flash tube and rectangular flash reflector one and three-quarters inches long and three-quarters of an inch wide. The flash has an U/W guide number of 16 with ASA 64 film.

Also mounted on the rear of the strobe head is an on/off dial switch which features a third position for manually firing

the strobe to test battery power. The flash is fitted with a three foot long coiled cord and a bulkhead fitting that screws into the base of the Marine AD Housing. An O-ring gasket on the bulkhead fitting prevents water leakage. Inside the housing, the flash cord connects to a synch wire coming from the shoe mount on the top of the camera.

The flash arm and bracket assembly for the Ricoh Marine Flash are constructed of heavy gauge pre-bent stainless steel. The bracket is made in two parts and can be disassembled easily for travel. The upper portion of the bracket slips into a plastic eyelet on the side of the housing and the baseplate is screwed into the bottom of the housing. Incidentally, the flash arm/bracket assembly should be mounted on the hous-

ing, housing and camera remain a compact system which can be carried in a small case. The Ricoh Flash is listed at \$259, which includes the flash arm bracket and flash cord connector.

PERFORMANCE

SDM first tested the AD-1 above water and found that it worked beautifully as a 35 mm pocket camera. It proved extremely handy aboard dive boats and during travel to the Caribbean. The lens is sharp and the automatic exposure system takes the guesswork out of photography.

Selection of film is important in helping the AD-1 obtain the best picture quality possible. Since exposure is fully automatic, the operator's control lies only with film selection. Choosing a fairly fast film



The housing's lens port rotates to focus the camera lens. The bull's-eye symbol indicates a focused distance of seven feet. The lens port glides on an O-ring seal. The camera can be slipped into the housing easily when aligned correctly.

ing before the bulkhead connector is screwed into place. Once fully assembled, the flash arm/bracket becomes a fixed mount system that is not detachable underwater. However, the strobe head can be swiveled and there is an engraved scale which indicates the proper angle for close-up pictures as well as focus at 3.3 and seven feet.

The Ricoh Marine Flash is totally compatible with the Marine AD Housing and the Automatic Exposure programming in the AD-1 camera. Fully assembled, the

(higher ASA number) can improve picture sharpness and depth-of-field. For color slide film, we found Ektachrome 64 excellent in strong sunlight. Fujichrome 100 is preferable for late afternoon or shade shots.

We found it comparatively easy to install the AD-1 camera in the Marine AD Housing. The keyway on the lens collar needs to be lined up with the housing's focus ring and we found it best to place both focusing scales on the bull's-eye setting. The tripod screwmount on the

housing is spring loaded and must be pushed inward to engage with the camera mount and then fully tightened. Also, the autowinder knob on the housing must be pushed inward before the door of the housing will fully close. These are the typical idiosyncrasies which every underwater housing seems to have. Once learned, the ritual of loading the housing becomes almost second nature.

One more point worth mentioning is that the camera must be removed from the housing to load and unload film. It is not possible to open the back of the camera while it is in the housing because of space limitations. This is one of the trade-offs which Ricoh had to make in choosing an ultra-compact design.

The flat port on the front of the housing places a few limitations on the effective

ing must be held 4.5 feet away in order to achieve a sharp picture.

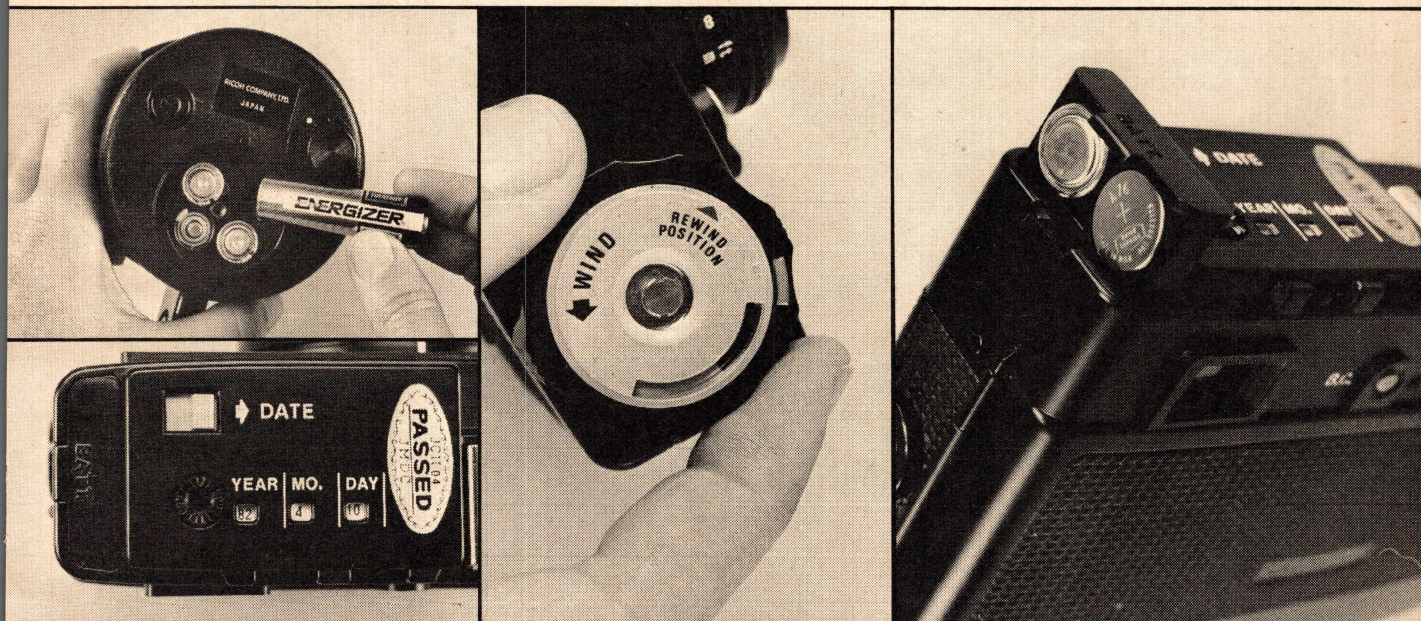
We found the minimum distance of the camera lens (3.3 feet) too limiting for most underwater situations. The lens limitations and flat port forced us to shoot pictures at four feet when we really wanted to be at two feet. Cloudy water softened the picture image and the long camera-to-subject distance subdued the colors because of the natural blue/green color filtration of the water. To improve the performance of the Ricoh Marine AD System, we visited a local camera store and purchased a set of close-up lens attachments. These screw right into the front of the camera lens and there is sufficient room in the housing for their usage. Although 46 mm lens attachments are an offbeat size, we managed to locate a set

derwater color filtration.

CONCLUSION

We found the Ricoh Marine AD-1 System to be well made and practical. It is easy to operate and produces good quality photos, especially when used with close-up lens adapters. The price is reasonable and well within the budget of the average diver.

Best of all, the Ricoh system is uncomplicated. It is an ideal starter unit for the diver who wants to learn a little bit about underwater photography, but does not want to spend long hours fooling around with confusing equipment. It should be remembered however, that the Ricoh system is designed for amateur photographers. Don't expect this inexpensive camera system to produce professional



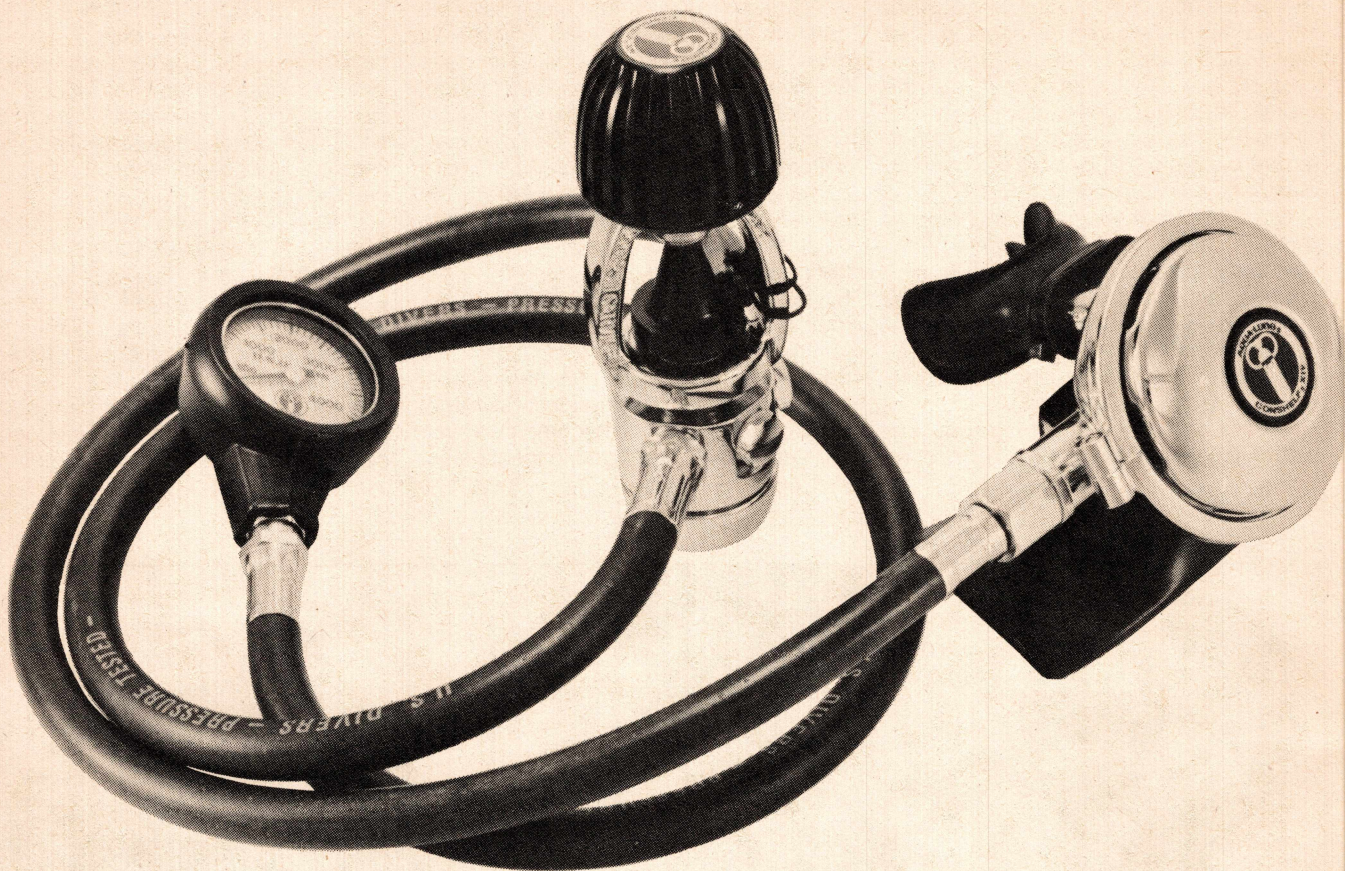
Ricoh's Marine Flash is powered by four AA alkaline batteries. The date setting device on the AD-1 camera records year, month and day numbers which appear in the lower right of the film negative or color slide. When fully energized (wound up) the autowinder will power 10 to 12 shots. The AD-1 camera uses two 1.5 volt, silver oxide, button batteries to power the auto exposure.

performance of the camera lens. Because it is a flat port, the camera lens is affected by a form of optical distortion known as refraction. Light rays passing through the port are bent, thus narrowing the angle of lens coverage and causing a slight telephoto effect. The AD-1's 35 mm lens behaves like a 48 mm lens underwater. Furthermore, this refraction makes underwater objects appear 25 percent closer. Although the camera lens may be set on a focus distance of 3.3 feet, the underwater hous-

ing of Hoya Close-Up Lenses for \$26.50. The set included three screw-on lenses (plus 1, plus 2, plus 3) with different magnification powers. By switching these close-up lenses and adjusting the distance of the lens, we could now focus the camera from 8 to 36 inches. This close-up photography produced much sharper pictures and a great deal more color. We also recommend the Ricoh Marine Flash be used with the housing and camera at all times, as the flash restores the rich colors which are lost through natural un-

quality photos like those taken with a Nikonos 15 mm lens. There is a big difference in both price and performance. On the other hand, the Ricoh automatic exposure system, zone focusing and other simplified features certainly help to take the mystery out of underwater photography and make it pleasurable.

For more information about the Marine AD System, contact your local dive store or write to: Ricoh of America, Inc., Camera Division, 20 Gloria Lane, Fairfield, New Jersey 07006. 📷



Conshelf Supreme

BY GEORGE COZENS

In the mid-1950's, Scuba diving was in its infancy in this country. And like most infants it developed quickly — prompted by the growing interests of people seeking adventure in this new and exotic sport, and aided by the expanding variety of dive equipment. And what a variety. A lot of gear appeared on the dive scene within a relatively few years: Some of it outrageously crude by today's standards, but some of it amazingly successful. A lot of this equipment disappeared just about as quickly. Some of it, however, survived the ravages of time, the environment and the marketplace to earn a respected reputation in the sport.

A case in point is the Conshelf, a regulator made by U.S. Divers, one of the oldest dive equipment companies in the United States. The original design of this regulator dates back to the late 1950's. As the early model was im-

proved and updated, it acquired its present name, the Conshelf, in the mid 60's. In the years that followed, the Conshelf kept its name, but further improvements were marked by successively higher model numbers — leading to the Conshelf XIV, one of U.S. Divers' top-of-the-line (TOTL) regulators today. The other U.S. Divers' TOTL regulator is the Conshelf Supreme.

The XIV and the Supreme are almost identical. The first stage of each uses a balanced (to compensate for changes in tank pressure) diaphragm design, is housed in a chrome-plated, high quality marine brass body, and has one high-pressure port (for the submersible pressure gauge), three low-pressure ports (for the second stage, B.C. inflator, octopus, etc.), a 3000 psi rated yoke (which can rotate 360 degrees), a large ABS plastic easy-to-grip yoke knob, and a good ABS, O-ring sealed dust cap.

The second stages of the XIV and the Supreme (except for the name on the purge button) are identical. They are based on a patented venturi assisted downstream valve design (which will automatically relieve excessive pressure in the hose should a high-pressure leak in the first stage occur), with silicone rubber diaphragm and exhaust valve (for increased life of the rubber and reduced inhalation/exhalation resistance), oversized exhaust port and tee (for less exhalation effort), and a nylon tipped, stainless steel lever (which controls the opening/closing of the downstream valve — for corrosion resistance and minimum friction in operation).

Essentially, the only difference between the XIV and the Supreme is the hollow cap attached to the "back" end of the first stage. This cap covers the main first stage diaphragm and forms a

photo/George Cozens

chamber which houses the adjustable spring mechanism which regulates the intermediate air pressure. In order for the regulator to compensate for pressure changes owing to variations in depth, the main diaphragm must be able to sense the ambient pressure. In the Conshelf XIV, this need is accomplished with an open port in the cap, which admits water, as well as foreign materials, into the chamber. Such foreign matter may cause corrosion and hamper the proper operation of this part of the first stage — and so, provides a good reason for flushing the chamber with fresh water after diving. Additionally, when diving in very cold water, air passing through the first stage may chill the water in the chamber to the freezing point, thus immobilizing the spring and the main diaphragm.

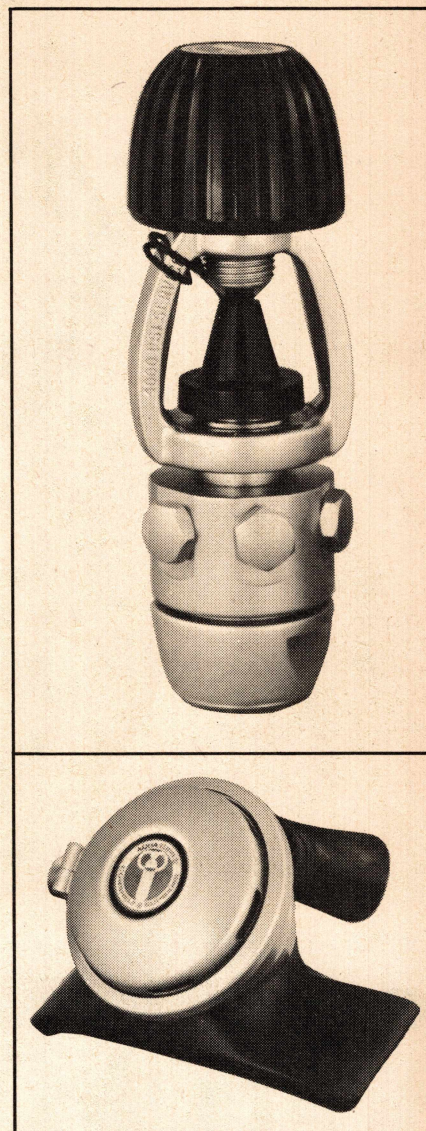
Enter the Conshelf Supreme. This model has a specially designed cap in which the port is covered with a small flexible diaphragm, and the chamber is filled with a special silicone oil. Such an arrangement allows the main diaphragm to sense the ambient pressure, but isolates it and the spring from cold and/or polluted water — thus eliminating corrosion, freezing, and salt/sand/grit buildup inside the chamber.

If you haven't guessed from the description so far, the basic design of the Conshelf regulators is quite conventional. No razzle dazzle, and no super sophisticated gadgets. Such simplicity in design can pay dividends in dependability and ease of maintenance. But don't let the terms "conventional" and "simplicity" mislead you. The Conshelf regulators can hold their own with the best of the more modern regulator designs. As mentioned in several earlier SKIN DIVER articles, the U.S. Navy Experimental Diving Unit (NEDU) tested 36 regulators under identical laboratory conditions during the summer of 1979. Results of these tests were published in NEDU Report #2-80, "Evaluation of Commercially Available Open Circuit Scuba Regulators," by James Middleton, dated March 1980, and were summarized in the November 1980 issue of SDM. The Conshelf XIV, as you might recall, was one of seven regulators which met the criteria of the high performance class (i.e., able to deliver large quantities of air with minimum breathing effort). That's pretty good. Although the Conshelf Supreme was not tested, it should exhibit the same high performance characteristics, since it is essentially identical to the XIV, internally.

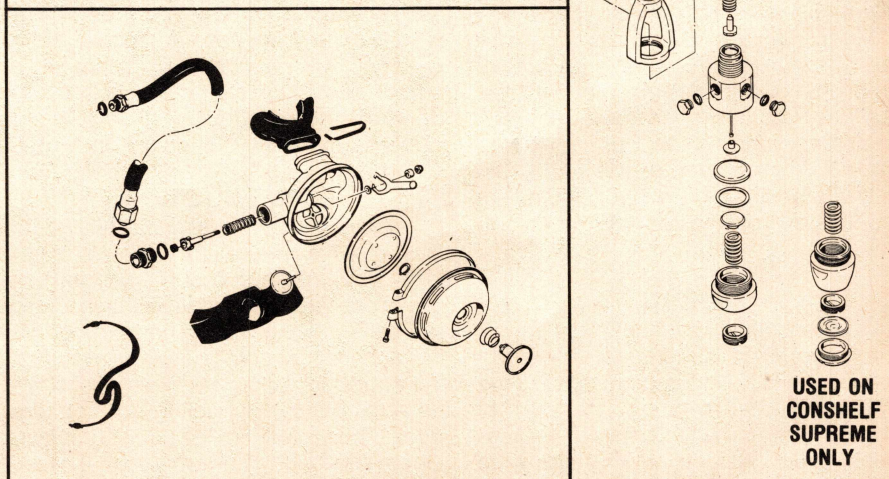
Laboratory tests, however excellent, may not tell the whole story about a regulator's operation. To make my own eval-

uation, I took the Conshelf diving. It performed up to my expectations — there were no surprises, and no strange behavior. From light sipping to large inhalations, it supplied air with low inhalation resistance. Exhalation resistance was also quite low. With my head upright, looking horizontally, most (but not all) of the exhaust bubbles ascended out of my field of view. By looking slightly downward, all of the bubbles would pass by the sides of the mask. Rolling my head from right to left didn't seem to affect the inhalation resistance much, but did seem to make exhalation slightly easier. When looking vertically down, inhalation effort still didn't seem to change, but exhalation did become a little harder. Standing on my head resulted in a little less inhalation effort, but a proportionate increase in exhalation effort. While on my back, looking up, the inhalation effort increased noticeably (as expected from a single hose regulator), and exhalation effort decreased by about the same amount. With the second stage held out of my mouth, free flowing could be started easily when the mouthpiece was directed vertically up, but would stop once the second stage was inverted. Overall, I found the breathing characteristics of the Conshelf to be very good — in the various stationary positions described, and while swimming. There was, however, one idiosyncrasy I noticed during my evaluation: when making larger inhalations, the rush of air was accompanied by a fine water mist — not too much water, even in the worst case experienced, but detectable just the same.

(Continued on Page 76)



Above right, the first stages of the Conshelf XIV and Conshelf Supreme have one high, and three low pressure ports. Mid right, both models have the same second stage. Below left, exploded view of the second stage. Below right, the first stage exploded.



photos/Geri Murphy



SEA FLASH II

Australia Produces a Unique Wide-Angle U/W Strobe

Text and photography by Geri Murphy

An Australian firm which specializes in aluminum underwater housings has recently introduced a submersible strobe, unique in design and features. Sea-Tite Products of Sydney has been producing underwater photographic products for over a decade and presently offers a line of 11 different aluminum underwater housings for 35 mm cameras and movie equipment as well.

DESIGN

The Sea-Flash II is a beefy little underwater strobe constructed of a rugged aluminum alloy and featuring an extreme wide-angle flash reflector. The angle of flash coverage is an impressive 110 degrees, sufficient for even the ultra-wide 17 mm lens on a 35 mm SLR. Perhaps the most startling feature of this wide-angle

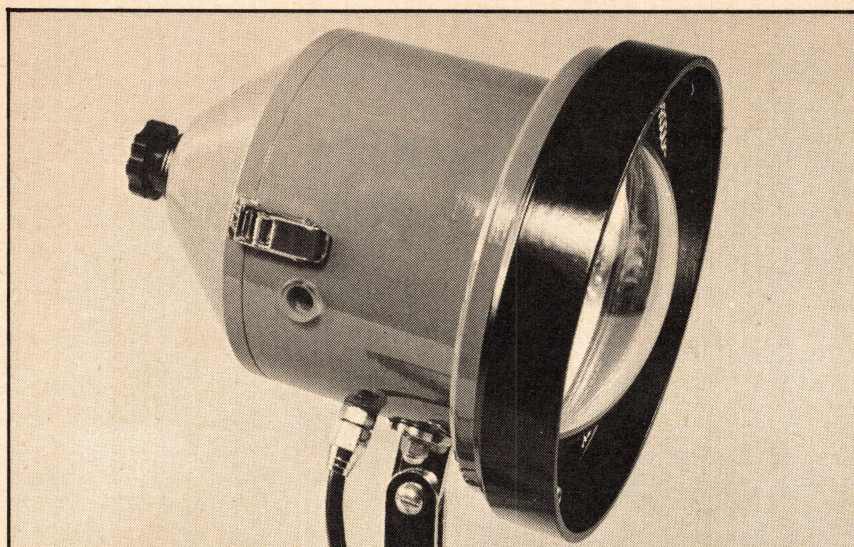
flash is that it is powered by a set of four AA alkaline batteries. A set of fresh batteries will provide 150 flashes. The combination of an all-metal housing, 110 degree flash reflector and AA penlight batteries makes the Sea Flash II unique.

CONSTRUCTION

The Sea Flash II housing has two parts, both of which are aluminum alloy castings. Both inside and out, these have a bright orange epoxy coating which totally seals the casting walls. The front portion of the housing contains the main guts of the strobe including the flashtube, flash reflector, electronic package and battery pack. The rear bell of the housing has an O-ring seal and the on/off switch. The removable rear bell provides quick and easy access to the batteries and is held

securely in place by two stainless steel snap latches. The entire strobe measures eight inches in length, from the rear switch to the front of the dome. The main body of the strobe is five inches in diameter but flares out to six and one-quarter inches at the flash reflector.

One of the unusual features of the Sea Flash II is its giant flash reflector. It measures almost five inches in diameter, making it just about the largest reflector in the submersible strobe field. The reflector is Sea-Tite's own design and features a special polished and dimpled finish. The dimple pattern helps to produce even lighting and eliminates hot spots. A large plexiglass dome port is mounted over the front of the flash reflector to eliminate any beam narrowing by refraction. This dome assures a full 110 degree field of cover-



The Sea Flash II is eight inches long and constructed of epoxy-coated aluminum alloy. The strobe is powered by four AA alkaline cells which will give 150 flashes. U/W guide number is 16 for ASA 64. An exposure guide comes with the unit.

age. The dome is held in place by an aluminum retaining ring and four stainless steel Allen screws.

There is a small plexiglass port on the side of the housing which provides a view of the strobe's ready light. Recycle time for the strobe ranges from six seconds on a fresh set of batteries to 15 seconds when the batteries are nearing exhaustion. The strobe is fitted with a standard six foot coiled cord with a chrome-plated brass Nikonos camera connector. Sea-Flash II buyers must indicate their preference for either a Nikonos I/II, or the III/IV connector.

ACCESSORIES

There are a number of accessories for the Sea-Flash II which are extremely helpful and improve the capability of this

unit. Sea-Tite manufactures cast aluminum baseplates for the Nikonos II and III and the Nikonos IV. The baseplate is also coated with orange epoxy. It comes with a handle grip on the right side and a flash arm mount molded onto the left side.

Sea-Tite has also designed its own flash arm assembly, constructed of a heavy gauge, chrome-plated tubing and made in two parts. The Universal Arm portion is 15 inches long and features a very interesting radial flange plate with seven different positions for the upper portion of the strobe arm. The flash arm can be rotated 360 degrees at the baseplate connection and also at the mid-section joint just above the radial flange. In addition, the seven inch upper half of the arm can be utilized separately, should the user desire a short flash arm.

All set screws on the flash arm assembly are 1/4 x 20 stainless steel with chrome-plated brass, knurled knobs.

One final accessory which is extremely handy for use with a Nikonos II or III is a heavy-duty, chrome-plated brass thumb release. This works especially well in conjunction with the baseplate handle.

PERFORMANCE

SDM first tested the Sea-Flash II in the studio with a flash meter. We discovered the light output to be surprisingly powerful despite the AA battery pack — about one f stop less than other rechargeable wide-angle strobes.

The manufacturer conservatively estimates the underwater guide number for the Sea-Flash II to be 16 with ASA 64 film. With a fresh set of batteries, we found the power output slightly better. An underwater exposure guide sticker is shipped with the strobe and provides a quick reference for use with ASA 25, 64, or 160.

We found the Sea-Flash II to be very well balanced for underwater use. The baseplate and flash arm assembly are highly recommended as they permit this strobe to be easily manipulated in dozens of different positions. The strobe's O-ring seals are quite substantial and it experienced no water leakage.

CONCLUSIONS

SDM found the Sea-Flash II to be extremely unique in design. It features a 110 degree angle of coverage and yet is powered by four AA alkaline batteries that can be obtained almost anywhere. It is a handy traveling companion for the underwater photographer using a Nikonos 15 mm lens in isolated areas where recharging strobes is difficult. We also found the unit to be extremely rugged, but compact enough to be easy to swim with underwater. It is the kind of unit you would want in a tough diving situation.

The Sea-Flash II sells in Australia for \$235 (Australian dollars) which works out to approximately \$290 in U.S. currency. (This can vary owing to fluctuations in international currency exchange.) The baseplate, flash arm and thumb release are regarded as accessories and sell for an extra \$143 (Australian).

At present, the Sea-Flash II is a little difficult to obtain, as Sea-Tite Products are not yet imported or distributed in the U.S. You would have to order this unit from overseas and pay customs duty upon delivery in the U.S.

For more information concerning Sea-Tite Products and shipping arrangements you can write to: Barry A. Davies, President, Sea-Tite Products, P.O. Box 179, Engadine, N.S.W. 2233, Australia.



THE AMAZING DETECTIVE

**GARRETT ELECTRONICS
COMPACT**

Sea Hunter XS500

TEXT AND PHOTOGRAPHY BY GERI MURPHY



Ask world famous treasure diver Bob Marx which hand-held metal detector he likes best and you'll get an enthusiastic reply, "Garrett's Sea Hunter — it really works!" This simple but highly esteemed testimonial underscores the magic of the Sea Hunter. It is easy to carry, easy to use and possesses a sophisticated metal detection capability.

The Sea Hunter was designed by Garrett Electronics of Garland, Texas — one of the major manufacturers of metal detector equipment in the treasure hunting business. Charles Garrett, president of the company, is an innovative electronics engineer who began treasure hunting as a hobby in 1947. Employed by Texas Instruments and Teledyne-Geotech, he had many design

photo/courtesy Garrett Electronics

achievements in the field of aerospace. In 1966, Garrett started his own electronics company and began building equipment for his first love — treasure hunting. Today, Garrett Electronics produces approximately one dozen different models of sophisticated metal detectors, plus a new concept in gold panning equipment and a portable gold dredge. One of the newest additions to the Garrett metal detector line is an underwater model designed specifically for the scuba diver.

DESIGN

The Sea Hunter XS500 is an extremely compact metal detector system designed specifically for use by one person. It features a totally pressure-proof, transparent, Lexan housing mounted on a short 22 inch stem, complete with arm brace and hand grip. The diver can operate the entire unit with one hand while digging or probing for metal targets with the other.

The Sea Hunter weighs 9.5 pounds out of water and is only slightly negative underwater. The searchcoil on the front of the device is hinged and will fold back for carrying purposes. In this position the total length of the detector is only two feet and it can be fitted into a small gear bag. For shipping purposes, the Sea Hunter can be easily disassembled with a screwdriver and packed in a small carton.

The business end of the Sea Hunter is an eight inch diameter co-axial searchcoil embedded in a solid plastic circular loop. It is through this searchcoil that the metal detector sends out its very low frequency electronic signal, seeking contact with any sort of refined metal such as: gold, silver, bronze, copper, platinum and large pieces of iron. The electronic signals radiate straight down from the searchcoil, penetrating the ocean bottom whether it is sand, mud, or hard-packed sediment. By holding this searchcoil two inches above the ocean bottom and moving the coil slowly back and forth, a diver can effectively search a large area in a surprisingly short period of time.

The heart of the Sea Hunter is a compact electronics package in an airtight, pressure-proof housing with O-ring sealed controls. The metal detector is guaranteed to operate to a depth of 200 feet. Each housing is individually pressure tested, then shut and sealed at the factory. The housing is made of clear Lexan which enables the diver to view the electronics inside, including various indicator lights and a special detection meter.



At the rear of the underwater housing there is a control panel with three different dials and an underwater bulkhead connector. The center dial is the power selector switch. On the left is a special electronic eliminator dial for screening unwanted signals. On the right is a tuning dial for attaining the optimum sound level. Above the tuning knob is an underwater connector for the headphones, which is also used for charging the batteries.

The Sea Hunter has three different signals that indicate contact has been made with metal: Two flashing lights at the rear of the housing; a TR Discriminator meter at the forward end of the housing; and an audio tone transmitted through a pair of underwater earphones. The earphones are ideal when the diver is in murky water or in a situation which requires total concentration on the terrain and manipulation of the searchcoil. When a diver is working in a fast moving current or on a broken terrain, there is little time to look at meter needles or indicator lights.

The Sea Hunter is powered by a set of three nine volt ni-cad batteries that can be recharged more than 1000 times. Two types of chargers come with the Sea Hunter. One will plug into a standard household outlet and operate from 110 volt 60 hertz AC power. The other can be plugged into an automobile or boat cigarette lighter and operates on 12 volt DC power. When the charger is hooked up and operating, red lights go on inside the underwater housing indicating battery recharging is in progress. The time required for a full charge is 15 hours. The 12 volt charger has been plugged in and intentionally left on for as long as two weeks without any appreciable drain on the battery.

OPERATION

The major advantages of the Sea Hunt-

er metal detector are its wide range of operating modes and its eliminator control which can screen out unwanted signals from such factors as natural iron mineral, salt water, trash and so on. The unit can be used in either a manual or automatic mode depending on the operator's preference and skill. In the automatic mode, the Sea Hunter continually retunes the detector precisely to its optimum pre-set threshold, despite environmental changes or variations. On the manual mode, the diver must retune for any ambient changes, but has more precise control. Garrett recommends the owner use manual mode whenever possible.

On the all metals mode, the Sea Hunter will detect any and all metals, including tinfoil.

The tuning knob on the Sea Hunter adjusts the audio level prior to use. Once underwater, the diver simply turns this knob until a faint, barely audible tone (known as the audio threshold) comes through the earphones. Once set in auto mode, the Sea Hunter will automatically compensate for any environmental changes. When the unit's searchcoil passes over a metal target a loud signal will be heard.

Garrett Electronics has tested the Sea Hunter under a variety of conditions and reports that it will detect a coin down to 18 inches under the sand or mud. Larger metal targets such as a cannon or large anchors can be detected as deep as six feet under the sediment found on the ocean bottom.

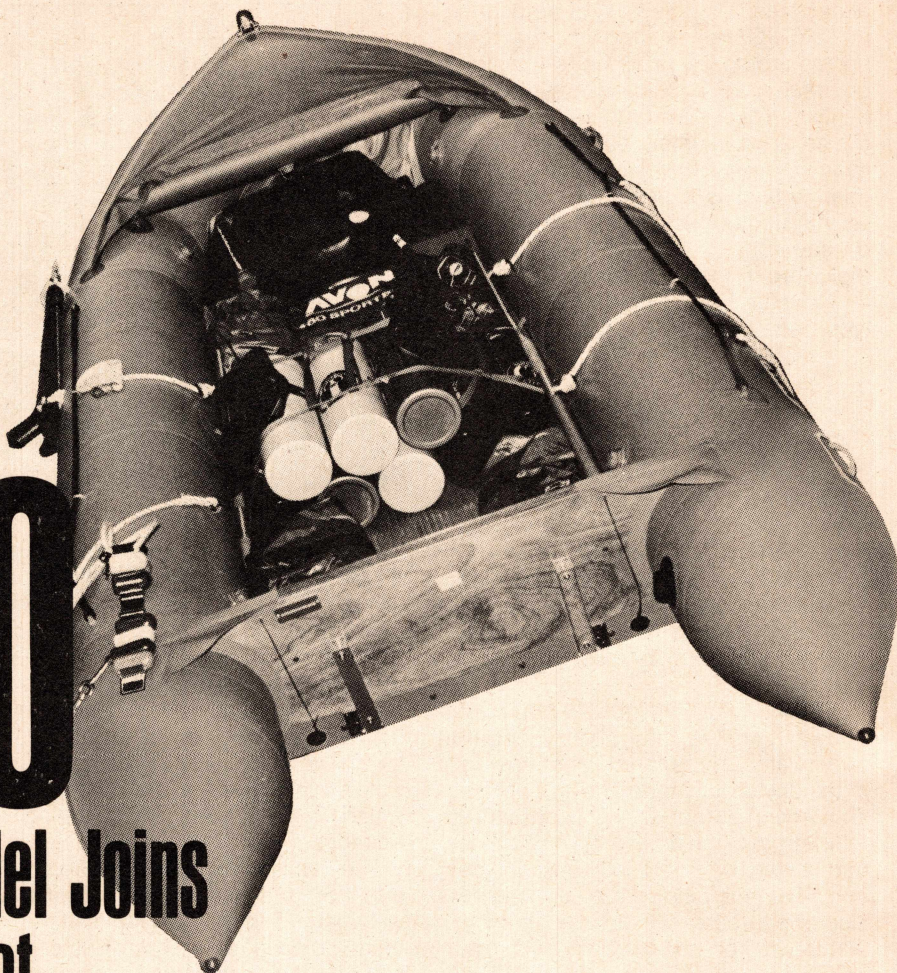
The Sea Hunter XS500 sells for \$695, complete with underwater earphones, chargers and carrying bag. Every unit carries a one-year warranty.

For more information or a color catalog of other Garrett metal detectors, write to: Garrett Electronics, Inc., 2814 National Drive, Garland, TX 75041. ☐

THE AVON S4.60

A New, Faster Model Joins Avon's Rugged Fleet

BY ERIC HANAUER



Unlike their Detroit counterparts, inflatable boat manufacturers don't get into the planned obsolescence routine with annual model changes. Take England's Avon Inflatables, Ltd., for example. They have been building quality boats for 20 years, mostly by hand. If the need arises, changes or improvements may occur at any time during a model run. But a new Avon comes along only about as often as a new Jaguar. So when it does, that's news. And like its wheeled counterpart, the changes are evolutionary rather than revolutionary.

Such is the case with the flagship of Avon's sportboat fleet, the S4.60. Avon model designations now reflect the length of the boat in meters, so the S4.60 is 4.60 meters long, or 15 feet for those of us who aren't up on our metric math. It replaces two former models, the S550 (14 feet) and the S650, a 16 footer. Its advertised payload is eight persons, or 2090 pounds. This means the craft can accommodate six divers with full ocean gear. Power can be provided by an outboard motor up to 55 horsepower, but a long shaft is necessary owing to the 20

inch height of the transom.

The current line of Avon Sportboats boasts several significant new design features which improve performance and convenience. To begin with, the shape of the hull and the tubes have been modified to enhance speed and fuel economy. The once tapered tubes are now parallel to increase rigidity and reduce splash. The disadvantage of the change is a slight decrease in load space.

The thrust board has been moved toward the bow so that the entire hull, from transom to bow, receives the power thrust of the engine. It also eases assembly of the floorboards.

The anti-hogging strip has been moved inside the pontoons. The term hogging refers to the tendency of the tube to bend or distort at high speed when it is not completely inflated. To counteract this tendency, manufacturers have placed strips of reinforcing material along the upper surface of the tubes. These strips can become obstacles when divers or equipment are hauled up over the pontoons, as they

catch lines and hoses. The internal strips on the new Avon leave a clean contour and eliminate the problem.

The red bowdodger, or splash screen, now has an inflatable tube to replace the old plastic reinforcing rod. This not only strengthens the structure, but also eliminates an extra part. A new tinted windshield of unbreakable Lexan is available for the bowdodger.

The floorboard assembly has been strengthened and simplified. This comes as good news for those of us who have struggled with the side battens of the old Avons and other inflatable boats. The three main floorboards (of marine plywood) are now assembled with their side battens outside the boat. The new side battens, as well as the fitting slots in the center board, are now aluminum extrusions. After the main floorboards are together, the boat can be partially inflated. Then the delta shaped bowboard is fitted into the thrust board, which is bonded to the bow. This assembly is angled upward, then intermeshed with the main deck assembly. Just push or stand on the

photo/Don Gerhardt

joint to snap the floorboards in place, then fully inflate the boat.

The S4.60 is the most versatile of the Avon boats, according to Dave Geoffroy, sales manager for West Coast distributor, Seagull Marine. Dave points out that it can be used for fishing, waterskiing, and cruising as well as diving. He went on to indicate a few more significant features of Avons. The fabric and seams carry a five year "no alibi" warranty, the most liberal in the industry. It covers use of the boat for any purpose in any conditions, even commercial use. The reason for such confidence is the fabric, nylon coated with a mixture of 85 percent Hypalon and 15 percent neoprene on both sides. Some manufacturers use Hypalon only on the outside, while others use an outer coating of it over neoprene. Hypalon, a synthetic rubber product of the DuPont Company, is extremely resistant to ozone, sunlight, gasoline, ultraviolet rays, smog and heat. However, when used alone it won't bond to fabric or hold air. Therefore, it is used in conjunction with other materials, usually neoprene.

The Hypalon-neoprene mixture is applied to the nylon through a process called calendaring. Seagull Marine president, Andrew Dossett, compares the process to that used in the manufacture of automobile tires. The nylon passes through heavy rollers and the mixture is forced through the weave under pressure.

I can personally vouch for the durability of Avon boats. My 1969 Red Rover is still going strong. We call it the *Grunion*, because at first we never knew where or when it was going to run. But that was a comment on the engine, not the boat. It has had its share of patches and a few modifications, but this veteran of many a dive trip will be around for a few more years. Divers are tough on a boat. They usually overload it, drag hard gear across the floorboards, and often don't give it the proper love and maintenance between trips. The old *Grunion* has survived all this, plus several 2500 mile trips the length of Baja California strapped to the top of a VW bus and doubling as a cartop carrier. When Dave Geoffroy says Avons are built to last, I believe it.

Dave next directed my attention to the new Avon's inflation valves. Their features are simplicity and ruggedness. All parts, except for a small spring, are rubber and plastic. A push and a twist on the plastic valve stem unseats it for quick deflation. When asked why Avon doesn't have interconnecting valves like Zodiac, Dave replied that he believes the Avon design is simpler and safer. Air cannot be lost from an adjacent chamber if another one is punctured. Chambers are separated by cone shaped floating baffles. In case of a pressure loss in one

chamber, the baffle will displace up to three cubic feet of air to compensate.

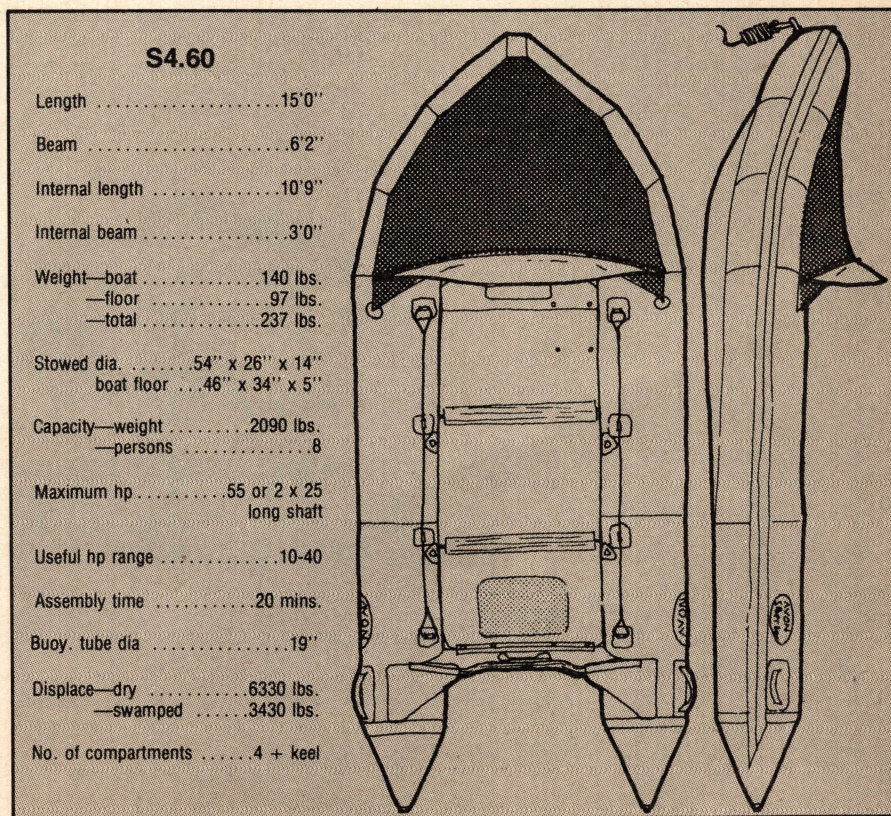
The S4.60 has four air chambers in addition to its inflatable keel. Avon had experimented with a wooden keel, because it can improve directional stability and provide a smoother ride. However, a hard keel makes the boat heavier, harder to set up, and is more likely to be damaged if the boat hits an obstruction. Finally, a wooden keel chafes against the floor, decreasing the life of the material. All things considered, Avon decided to stay with the inflatable keel. The amount of air pressure in the keel has a considerable effect on the ride. Dossett recommends starting with 1.5 psi gauge pressure, then experimenting up and down. One and one-half psi in the keel will feel quite soft, owing to the small diameter of the tube.

By contrast, the pontoons of the Avon should be inflated 2.5 to 3.5 psi. To estimate this pressure, stand on the hull. The tube should support a person's weight without much indentation. A better way to check, however, is with the optional pressure gauge. This is important, because an underinflated boat performs poorly and shows increased wear due to chafing. The tested bursting pressure of the tubes is 11 to 13 psi, so it is virtually impossible to overinflate an Avon.

As it comes from the factory, the S4.60 is an excellent dive boat. Such options as seats or remote steering only impinge on

storage space for gear. Furthermore front mounted controls place the diver in the hardest riding part of the boat. Yet, a few options and modifications are available that can enhance its role as a dive boat. When the floor is filled with equipment, passengers will be riding on the pontoons. Grab handles should be placed on the pontoons inside the boat for safety. A rubber pad will protect the floorboards from scratches caused by tanks and weightbelts. A plastic or rubber gas tank will do the same, as well as reducing weight and corrosion. Waterproof pouches can be added under the bowdodger to assure that dry things remain dry.

At 15 feet, the S4.60 is a bit too large to be considered a folding inflatable. That's the price of the extra carrying capacity. At 237 pounds without the engine, it's quite a handful for two people to set up and launch. Inflatables of this size are usually stored inflated, and carried on small trailers. They are launched more efficiently with the optional launching wheels. If the diver is interested in light weight, easy storage and setup and cartop portability, he ought to look into one of Avon's smaller inflatables. On the other hand, if he wants maximum cargo and passenger capacity, along with the ability to make longer trips on the water, the S4.60 fills the bill. Thanks to the decline of the British pound, it's still an inflation fighting \$2995 on our shores. >



TEMPERED DACOR LENS

DACOR'S VISTA DIVE MASK

Boasts many
features
including radical
new strap
design

Text and Photography by Howard Hall

The Dacor Vista is the most recent addition to a new generation of dive masks. It is stronger, lighter, more comfortable, and easier to use than masks of earlier, more conventional design.

The Vista has a neoprene skirt and strap, a tempered glass lens and a plastic rim. The soft neoprene skirt holds the glass closer to the diver's eyes than most masks. This increases peripheral vision and reduces mask volume.

A reduced air space minimizes the underwater bulkiness and buoyancy of a mask. It is also very important to free divers. The larger the air volume of a dive mask, the more air must be exhaled into the mask to prevent mask squeeze during descent.

The Vista has a molded nose pocket for quick and easy ear equalization.

The skirt on the Dacor Vista seals more efficiently on narrow faces than most dive masks.

The tempered lens of the Vista is cut quite low at the bottom corners. This increases the down-vision capabilities for the diver. Down vision is especially important when you are adjusting tank and weightbelt straps as well as when you are manipulating goodie bags and other accessories that may be attached to the waist strap.

The Vista is offered in both single lens

and double lens designs. Either way, it has identical fit and features.

The rim of the Vista mask is made of scratch resistant ABS plastic and comes in black, blue, yellow and orange.

The most exciting features of the rim, and perhaps the entire mask, are the



The Dacor Vista mask is lightweight and low volume. The mask strap can be easily adjusted while underwater.

strap buckles. Unlike conventional mask buckles which take minutes to adjust under the best conditions, the Vista can be adjusted almost instantly while you wear it underwater, even with gloves on!

The strap adjustment device is a spring loaded clasp on either side of the

mask. The clasp acts like a ratchet which allows the strap to slip through easily in one direction. Thus, in order to tighten the mask, you just pull the loose end of the strap.

Loosening the strap is nearly as easy. To release the ratchet mechanism, you simply slide the clasp forward. This allows the strap to slide through the mechanism easily in either direction. Again, this can be done while wearing the mask underwater.

How many times have you descended only to discover that your mask adjustment is wrong? Usually this means a trip to the surface or perhaps enduring an uncomfortable dive. With the strap adjustment features of the Dacor Vista, such problems are behind you.

The catalog number for the Dacor Vista mask is DM50. It sells for \$32 and is available at your local dive store.

Even more recently, Dacor has come out with the Mini-Vista (DM51). This mask is identical to the DM50 except that it is 20 percent smaller in size. This smaller version is ideal for children or small people who have difficulty finding a fit among standard mask sizes. The Mini-Vista comes in two colors: blue and yellow and sells for \$30.

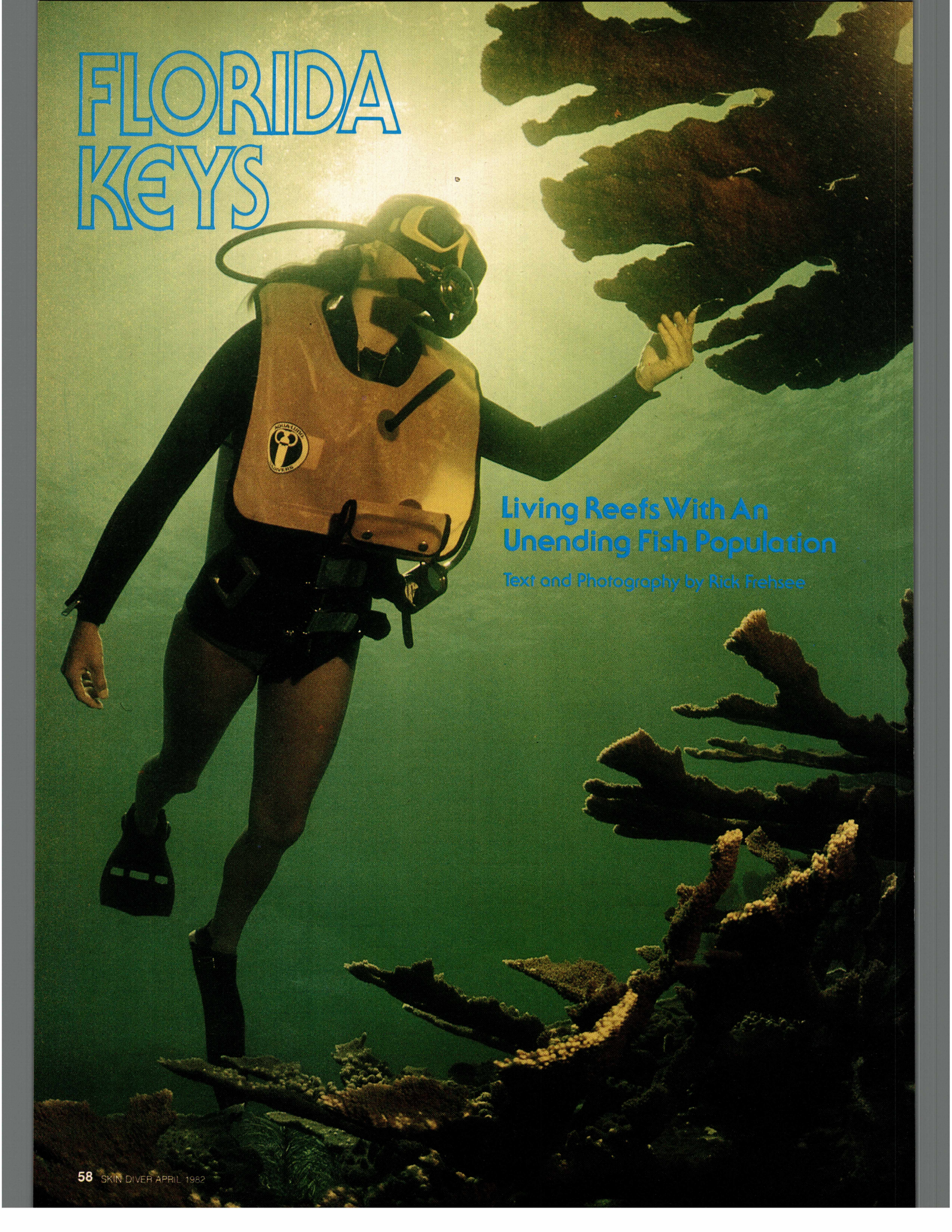
For more information write Dacor, 161 Northfield Road, Northfield, IL 60093.



FLORIDA KEYS

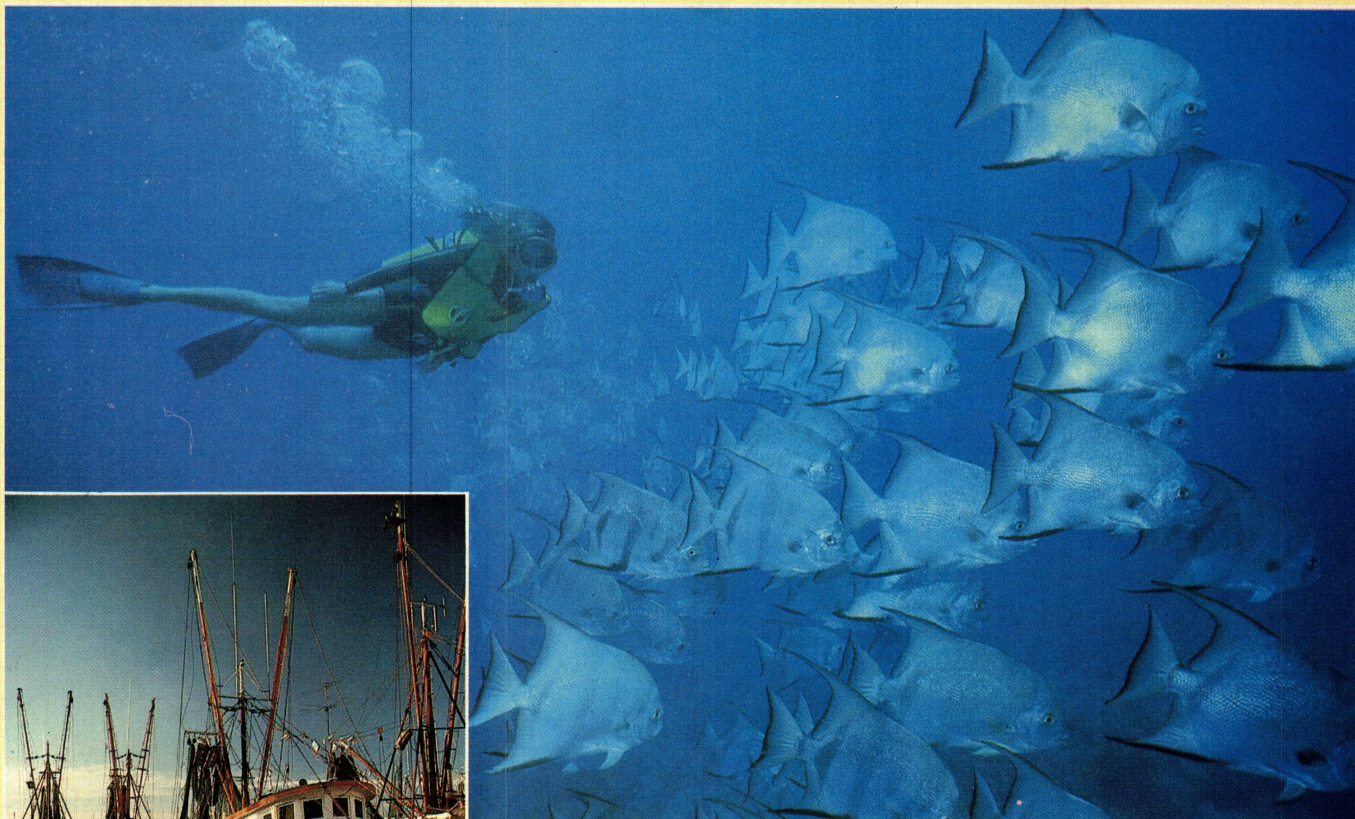
TRAVEL GUIDE

FLORIDA KEYS



Living Reefs With An Unending Fish Population

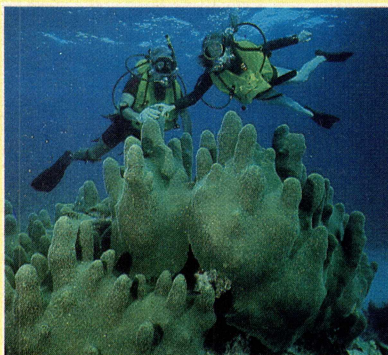
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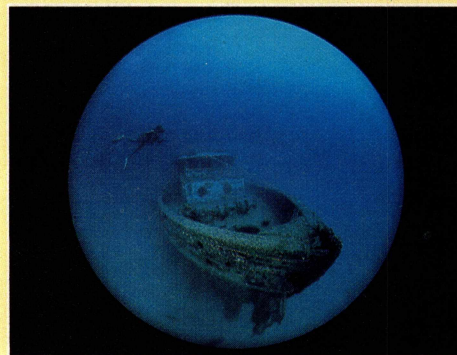
A diver follows school of spadefish as it passes over French Reef, Key Largo.



Key West shrimp boats in calm water.



Divers and pillar coral, Key West.

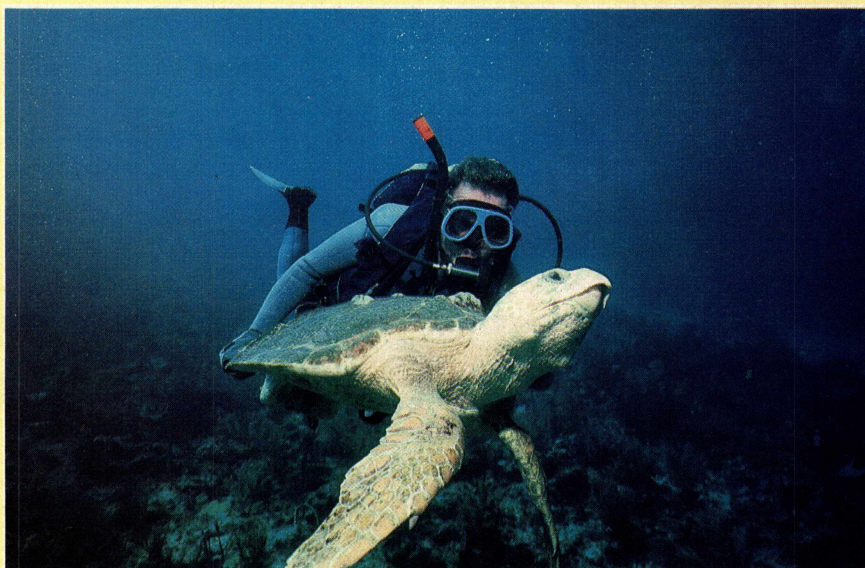


The Argonaut wreck off Key West.

The Florida Keys are the most popular dive area in the continental U.S. Easily reached by a single "overseas highway," this chain of nearly 200 low-lying islands parallels miles of almost continuous living reefs, clouds of fish and rustic wrecks; all within eight miles of the shoreline. It is little wonder that the Keys have become a mecca for sport divers.

In response to the needs of the thousands of visiting divers there is a support population of dive shops, charter boats and guide services second to none. Finding an experienced skipper with a well-equipped dive boat is a simple chore and the prices are competitive. It is also simple to find a group of divers with whom to share your experience. Yet, because of the vast expanse of underwater territory involved, there always seems to be room for more.

The Keys have plenty of coral, but their real claim to fame is an unending fish population the likes of which you will rarely see



North Carolina diver Bob Eastep with a turtle at Davis Reef, Islamorada.



Cottonwicks over Molasses Reef, Key Largo. Its close proximity to Miami and good U/W visibility make Molasses popular with divers.

elsewhere, regardless of ticket price. In most of the major areas such as Key Largo, Tavenier, Windley Key, Islamorada, Marathon, Big Pine Key and Key West, the dive operators have encouraged hand feeding the fish and often have their own pets in special reef sites. When conditions are at their best, with excellent visibility and calm seas, it is, as a northern friend once told me, "a wonder you Florida divers go anywhere else."

Of course, the conditions are variable, and therein lies the Keys' weakest link. But if you exercise some common sense and a little patience you will be rewarded with uncommonly good diving. Here are some good facts to keep in mind.

First, some of the heaviest reef formations and clearest water are located offshore the major islands which offer a buffering effect from the extremes of temperature and turbidity of the shallow bay-side waters. Next, consider that the Keys curve from north/south to east/west and conditions on the reefs can change within 100 miles owing to a changing lee. Visibility is affected mainly by wind—its direction and duration, but it is also affected by the tides, particularly near the bridges and largest cuts between the islands. As a rule, clearer water is further offshore.

The best general diving conditions are found in the late spring through early fall. The winds are usually low, except during the short-lived summer thunder showers and the visibility is usually better. The heart of winter can be tough on the Florida Keys but some of the grandest days of all follow the cold fronts. Then the sea calms down, the sky turns a deep blue, and visibility is crisp due to the encroaching Gulf Stream.

Forget about beach diving in the Keys. Even the snorkeling is poor just offshore in most areas. There are some good in-shore reefs, usually isolated patches that produce lots of fish, but these are still several miles offshore. In fact, if you are looking for true sandy beaches, they are few and far between. Best bet for sandy beaches would be Bahia Honda or Key West. The most common visual impression in the Keys is how flat everything looks. The horizon wraps around you in all directions providing an uncommon sense of the sea and its role on this planet. Often the tallest feature is a stack of scuba tanks.

Holiday weekends are usually quite crowded and if you don't have reservations early, you will literally miss the boat. On the Fourth of July, Christmas and La-

bor Day weekends every available space is quickly filled, trip after trip. The best bet then is to be part of a dive group with prior reservations. If you like to have the reef entirely to yourself, try diving during the week, when the human population thins out drastically. There are usually two dive trips per day with each operator, and both trips offer two tank dives. Night dives are available every evening somewhere in the Keys unless the conditions are poor.

The months of September and October are usually calm and the reefs are often devoid of dive boats. Come with a small group in the fall and get to know your divemaster well. Once you get his/her confidence you will probably be privileged with being taken to some favorite personal spots.

Picking the ten best of anything can be a controversial undertaking, particularly something as subjective as a coral reef. And, there are 100 reefs and 1000 dive sites in the 180 miles that is the Florida Keys. While it is impossible not to be influenced to some extent by personal observations and adventures made over 15 years of Keys diving, I have tried to make the selection with the average traveling diver in mind. "Secret" sites, extremely



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deep spots, and hard to find places have been avoided.

While no conscious attempt was made with regard to a geographical spread, it is interesting to note that no one area has a patent on the best reefs or fish life. Pennekamp Park off Key Largo, well known for its outstanding reefs and clear water has three great spots and is definitely a destination to consider. If a coral buff tells you the Middle Keys do not have the heavy reefs of Key Largo, he or she must never have dived Sombbrero. And, I might add, on my most recent jaunt through the Keys this area provided me with the most exciting encounters—a huge turtle on Davis Reef, an unforget-



The Winch Wreck at Molasses Reef, Key Largo.

table school of 'cuda on Sombbrero, and a large nurse shark at Delta Shoals.

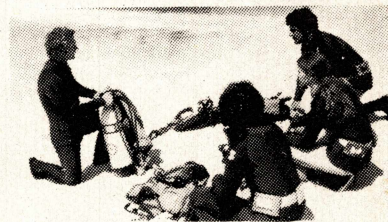
Further south and west is a coral fortress called Looe Key which would be included on any knowledgeable Key diver's top 10 list. With a lot of sameness throughout the Keys, Key West is probably the most different spot, and that goes for topside as well as below. Sand Key was selected over some other spots because it is an island that, in addition to good diving, offers shelter and a lovely picnic spot. And, finally, there is the little wreck of the *Aquanaut*, a novelty because it is intact, upright, and resting on the bottom like a Hollywood set. Hit all ten and you'll have an excellent cross section of what the Keys have to offer.

CARYSFORT REEF

Carysfort is a sleeper site off Key Largo. Located a short distance from the northern limits of Pennekamp Park, this large area is easily found because of the 100 foot lighthouse marking the shallows. The huge steel tower was built in the 1850's and served as a model for the other lighthouses which dot the offshore reefs of the Keys. Because of the distance from the harbors and cuts used by the majority of the dive operators, Carysfort remains a mystery to many divers who frequent the Upper Keys.

This reef area is quite extensive and provides a variety of moods and pleasures. In the shallows, a classic elkhorn

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reef thrives, sprinkled with thorny staghorn coral. The south ledge of the shallow reef extends more than two miles to the south of the tower and offers some of the most spectacular elkhorn formations in the park.

At intermediate depths there are large patches of head or dome corals which billow up from the reef profile. Fish life is diverse and prolific with almost every Key's species represented. In 25 to 35 feet of water, 300 yards northwest of the tower, are a couple of huge anchors from old sailing ships.

East, northeast of the lighthouse is a famed sloping terrace of staghorn—a beautiful cascading reef which is alive with schools of goatfish, blue tang, spadefish, grunts and snappers. Fighting for space with the staghorn are heads of brain and starlet coral and sheets of lettuce coral which finally give way to sand at 65—75 feet.

FRENCH REEF

French has a greater variety of bottom features than any other reef in the Florida Keys. Located about a mile and a half northeast of Molasses Reef, and five and one-half miles from Key Largo, French offers something for everyone including some of the best coral canyons this side of Grand Cayman.

There are impressive banks of elkhorn coral in the shallows atop extensive spurs and coral buttresses. In 25 to 35 feet of water, parallel to shore, is an intricate system of high profile coral heads. Some are linked together, looking like a mountain chain, while others are separated by winding sand channels appearing as single peaks. Many of the heads have deep ledges and overhangs. A few, which have been completely taken over by the physical and biological breakdown of the reef, are riddled with caves like Swiss cheese. At least three of these caves are landmark dives, and Christmas Tree cave is probably the best. It's an easy swim from one side to the other and has enough clearance so that if you are careful you won't stir up the sand bottom. Many times, especially during the winter, the caves are filled with the fluttering movements of glassy copper sweepers, which dart about like butterflies.

In deeper water there is an extensive system of isolated heads and long-running ledges which adds another dimension to French Reef. In 65 to 85 feet of water is an impressive low-profile spur and groove system not unlike Crocker Reef to the south. And, finally, in 125 to 165 feet of water is an ancient reef system that is quite dense and covers a large area. However, this area is usually bathed in heavy current. For wreck divers, the *Benwood* wreck is not far from French and offers good exploration in a manmade fish habitat. You don't really begin to appreciate the diversity of this

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fine reef until you have been there many times.

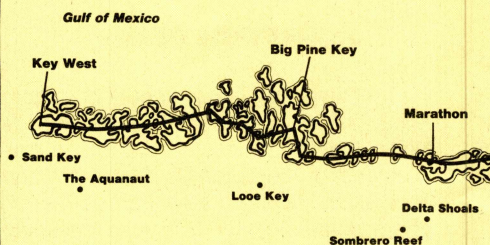
MOLASSES REEF

Molasses is the most popular reef in the Florida Keys and the one that you are more apt to see in photographs of the Keys. There are two good reasons for this: First, it is very accessible—close to Miami and a straight shot out of Key Largo for the majority of dive operations. And, secondly, the operators know from experience that Molasses will probably have the best visibility owing to geographical and physical factors.

Located near the southeastern boundary of the park, where it is bathed by the

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clear Gulf Stream and easily marked by a 50 foot steel tower, Molasses is apt to be quite busy on any good weekend. Fortunately, it is a fairly large area. If you want to avoid large dive groups, try it on a weekday.

Molasses is a paradise for fish watchers; it has a large colorful assortment of fish that will keep a curious naturalist or a devoted fish photographer busy for months. Near the tower the depths are very shallow, seaward they tumble away to a sand bottom in 40 to 45 feet of water. There is plenty of elkhorn coral in shallow water and huge, dome-shaped spires of star and starlet corals on the southeast corner of the reef.

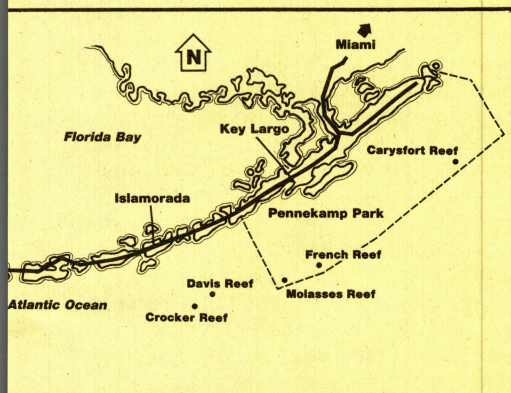
Beneath the ledges and overhangs are bright orange and yellow encrusting sponges, soft corals and bryozoans. There is an area of wreckage in a natural sand amphitheater known as the Winch or Windlass wreck and hordes of grunts and snappers hanging atop the coral spurs. Eastward from the Winch Wreck is a scenic natural bridge called the Hole-in-the-Wall which is large enough for two divers to swim through. Molasses remains a great American reef.

DAVIS REEF

Davis Reef is the fishiest reef for its size in the Keys. This heavy patch reef is a series of isolated heads and broken plat-

form effects with meandering ledges. Located off Islamorada and about five and one-half miles from shore, Davis is without peer as a habitat for schooling fish, reef tropicals, and trumpetfish.

Hundreds of yellow goatfish and striped grunts hover over the bottom, thick enough to obscure your dive partner on the other side. With careful movements you can choose your position and distance with underwater camera and plan for wide-angle, group scenes or dramatic close-ups of individual fish. Other good subjects to consider for photographs at Davis are the majestic purple seafans encrusted with orange sponges and the bright yellow trumpetfish which often occupy the same space. Also note-



over 150 miles westward into the Atlantic.

worthy inhabitants on the top of the reef are large puffers, scrawled filefish and green parrotfish.

Whatever turtles like is here and on my most recent dive at Davis, Bob Eastep, a dive shop owner from Beaufort, North Carolina, temporarily corralled a large loggerhead while I snapped pictures. The sight of Bob with this handsome turtle was a great marine memory.

Under the ledges are an almost endless parade of snappers, an occasional large grouper and numerous green morays. There is a dolphin marker close by but because the main area of the reef is small, you need a guide. If you like fish but don't want a long swim, Davis is your reef.

CROCKER REEF

Crocker is one of the top ten Florida Keys deep reefs. Almost in a line with Davis, but a few miles further south, Crocker is an offshore reef with a fascinating, rumbling drop-off of jagged staghorn, huge barrel, basket, finger and vase sponges, and swaying seafans. The depths are variable, starting at 35 and going to 85 feet and a sand bottom. The main reef is generally a low-profile spur and groove system which is frequented by a variety of inshore and offshore species. Years ago I saw large jewfish at deep Crocker but that excitement has not

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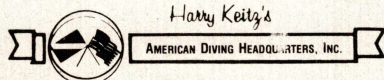
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repeated itself recently.

Crocker's deep ledges offer a good opportunity to see schools of mackerel, kingfish, large amberjack and schools of barjack and blue runner, with an occasional turtle or oceanic sunfish. Crocker is also noted as a home for numerous deep-water tropicals which find cover in the basket sponges or beneath ledges and overhangs on the coral spurs. Visibility is usually quite good, averaging 60 to 70 feet in the summer and 40 to 50 feet through the winter months.

DELTA SHOALS

Delta Shoals is an example of a reef system that is secondary to the interesting fish life and isolated wreckage found around it. Although this is an offshore reef in line with Sombrero Reef about two miles to the south, Delta Shoals' best area is less than 25 feet deep. The actual reef is a striated patch reef system punctuated by patches of dome corals and elkhorn formations. The reef runs east/west and is quite narrow. Since it is shallow, most of the marine life can be seen while snorkeling and, on the ocean side of the patches, the broken remnants of several old ships can be found. Perhaps the most famous is the Ivory Wreck which was named after the elephant tusks that were part of the recovered cargo.

A Delta Shoals landmark is the elkhorn tree which is one of the best patches of elkhorn coral in the Middle Keys. Hundreds of yellow-striped grunts filter through the golden antler-shaped branches. Under a series of craggy ledges and broken platform coral a short distance east of the elkhorn tree, one or two very large nurse sharks can usually be found. Recently I photographed one that was easily eight feet long. Normally a tolerant species that only becomes aggressive when physically abused, the great gray animal allowed me to caress its sandpaper skin and take portraits of a clinging remora that looked like an eyebrow above a vacant eye.

Besides nurse sharks, Delta Shoals is also an excellent spot for big lobster and grouper. The area is not very busy with dive traffic, and good lobstering and spear fishing are reported.

SOMBRERO REEF

Sombrero is the heaviest, most impressive reef system in the Middle Keys. It is also one of the most popular, not only because of its underwater sights which are magnificent, but also because of the 140 foot steel light tower that marks the inside shallows. The reef is extremely well-developed and so thick that in 25 feet of water you can barely swim over the tops of the corals. The reef fingers are formed in a well-developed spur and groove system with the winding sand channels forming a natural scenic route for scuba

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U/W PHOTO INSTRUCTION
by Stephen Frink

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MAY 11-13	AUG 3-5
JUNE 15-17	AUG 10-12
SEPT 7-9	

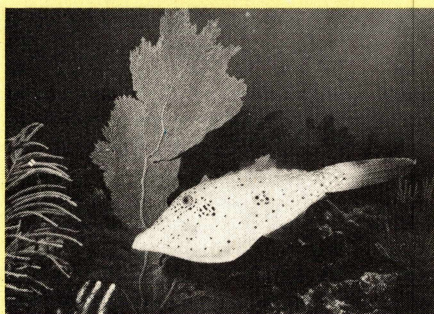
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divers. In 15 feet of water, on the inside grooves just south of the light, is a natural coral bridge called the Archway. All over Sombrero Reef there are magnificent fissures, ledges and overhangs with big-eyes, squirrelfish and butterflies parading through elkhorn, staghorn and fire coral formations.

My latest dive on the outside of Sombrero produced a tremendous thrill and brought back fond memories of my earliest dives here. In the distance, perhaps 60 feet away at the edge of visibility, I began to see a few large silver streaks hanging in mid water. As I approached closer I could see several barracuda that were close to five feet in length. As I swam still closer I began to see more and more big silver logs, in fact several dozen. Then, at my closest range, I realized that I was confronting a wall of barracuda. I took a few pictures and then



Scrawled filefish, Davis Reef, Islamorada.

stopped to carefully count them. There were 54 and not one less than 3 feet long. At Sombrero Reef, if the visibility holds, so will your curiosity.

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Looe Key, named after the *HMS Looe* that went down here in 1744, is the most spectacular reef in the Lower Keys. It is technically not a key since a hurricane washed away the sand flat over 150 years ago. This prolific reef system is located about six and one-half miles off the coast of Big Pine Key and runs the gamut of depths from two to 85 feet. The bulk of the most magnificent corals are located in the inner core area which is about 300 by 800 yards. Within this area over 40 species of Western Atlantic corals can be found.

The heaviest formations are within the 2-40 foot depths which the larger numbers of schooling fish frequent. A little more than a quarter mile to the southeast of the V-shaped shoal, the bottom falls away rapidly from 50-85 feet. This is an excellent deep reef with a drop-off that is as close to vertical as can be found in the Keys. The steep slope supports heavy boulders of coral with deep clefts harboring large fish and lobster. Looe Key usually has excellent water clarity and moderate sea conditions and the wide range

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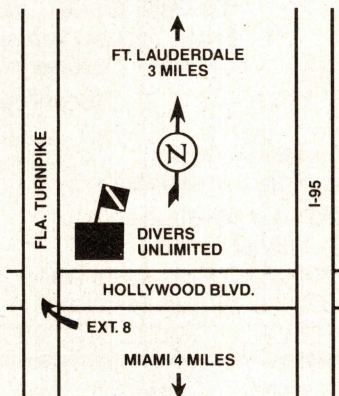


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of depths offers divers a variety of action and scenery.

Recently, Looe Key has been declared a marine sanctuary and will eventually be managed by the Department of Natural Resources. Steps are now being taken to eliminate anchoring as well as fish and lobster traps so that the beauty of this fascinating ecosystem will be protected and preserved for generations to come. If you can dive only one reef in the Lower Keys, Looe is the one.

THE AQUANAUT

This is our choice for a nifty wreck dive in the Florida Keys. It is not, however, simply a token selection. Although the *Benwood* wreck (Key Largo) is bigger, the *Infante* wreck (Windley Key) is more historical, and the *Deep Gunboat* (Key West) more dramatic, the *Aquanaut* is a modern steel workboat which is in 85 feet of water on the way to Sambo Reef out of Key West. She is 82 feet long, sitting absolutely upright on a smooth sandy bottom with hull and superstructure intact. When the wreck first comes into view it is a spectacular sight. When the visibility is good, it is possible to see the entire wreck from a single position. Feeling very much like you are part of an adventure movie, you can peer into the wheelhouse at 60 feet and watch the tropicals and schooling fish milling about. Large jacks and barracuda often swim just over the superstructure and large grouper are often seen. If the currents and sea conditions are mild, try to schedule this dive to see what a good wreck dive can offer.

SAND KEY

Sand Key is your safe bet for all-weather diving in the Lower Keys. Western Sambo, a short distance to the east, actually has better reef formations, but in the middle of Sand Key there is a small flat island marked by a 110 foot steel light tower. Not only is the island easy to find, but it offers some protection from the wind regardless of direction. You can always find a lee here for good snorkeling and shallow scuba diving.

Sand Key is about 6 miles south of Key West and is a popular picnic spot as well as a fast cure for seasickness. The best diving is on the ocean side of the key in 10 to 25 feet of water. Here there are good coral trails, majestic pillar formations and plenty of colorful tropicals. Further on the outside is a system of nice ledges and overhangs which provide cover for large grouper and snapper. Plan a picnic or a midday break at Sand Key for a change of pace in Florida Keys diving.

QUESTION:

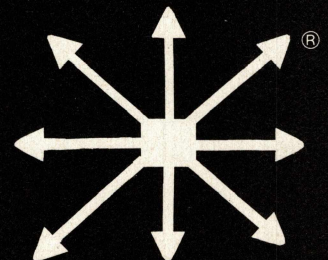
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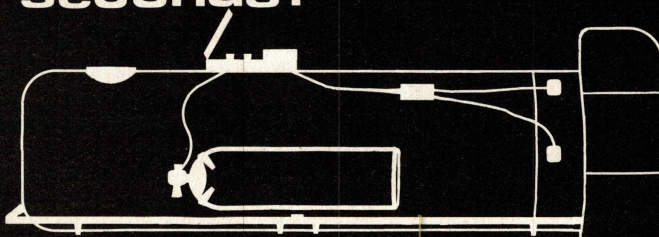
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ANDREA DORIA TREASURE

PART II

By Jack McKenney

Last summer, Jack McKenney, Peter Gimbel and his wife, Elga Anderson, and Bob Hollis were among the people who dove on the Andrea Doria in an attempt to salvage the two safes known to be entombed in her. Last month Jack described the rigors of sat diving and the preparations made for raising one of the safes. This month he tells how the expedition ended.

Up until now all efforts had been directed toward getting the doors open and I felt that if another cameraman was pressed down, and two bell runs made each day — one a photo excursion and one a working dive — we could film much of the ship that would be recognizable to the viewers. For the most part visibility was running around 15 to 20 feet. It would be nice to wait until we had 50 or 60 feet of visibility again for the exterior shots, but that might not happen. If it did we could simply shoot it over, but it was better to get whatever we could while we had the chance.

Hollis entered the complex. Bob and I have been friends for years and it's always a joy to work with him. He has a good sense of humor and we laugh a lot, but more importantly he has a sharp, analytical mind with a solid engineering background, so he approaches everything logically. He suggested we take measurements off the ship's blueprints and measure the distance from the hole cut in the side of the hull to known points in the foyer, and then to the bottom where the safe should be. We measured 67 feet to the debris, two feet short of where the Bank of Rome safe should be if the plans indicated its position correctly. As it turned out we were within about eight feet of it.

After that we swam to the bow, right to the limit of our 200 feet of umbilical, to film the ship's name. The letters, two feet

high and made of solid brass, were thickly overgrown, so we spent a half hour scraping and cleaning them before the filming.

Wednesday, August 12. I'm beginning to fall to pieces physically. My skin has broken out and my right ear has started to ache. Also feels as though I'm coming down with a cold.

We have a lightning storm today. Don't imagine it'll be much fun working on the surface. Bob and I will be making the first run. It is now 6:45 am.

Bob, Raul and I are in the bell by 8:30 am. I am first into the water at 9:10. Water is dark. Visibility about 15 feet. Spent an hour waiting around because Bob's coms were shorting out in his mask. Shot some material of Bob entering and exiting the bell. Then Bob measured down to the chapel hallway. I went down and measured into the chapel area. (It was rumored that a large solid silver plaque worth \$250,000 was on one of the walls). All that's left is a beautiful parquet floor. I could see where the altar had been, but it, along with the pews, have fallen away to the bottom. Walls and debris from above have also fallen, covering whatever was in the chapel. Exposed sinks and bathroom fixtures are still in place.

Bob and I went into the first class dining area to film him gathering dishes, but the camera malfunctioned, so he picked some up and we exited. I was really upset about the camera. Spent four hours in the water today.

Probably on about 75 percent of the excursions, various things happened that caused delays and inconveniences. I guess some one person could be held accountable, but when a highly complex project like this is operating, Murphy's Law is bound to play havoc every once in awhile. It's evident in everything that's done — even the space program isn't immune to problems. But occasionally things happened that could have been

very serious and perhaps even fatal.

On Thursday, August 13, Bob, Larry and I entered the diving bell at 8:50 am, and while it was being lifted off the ship, the cable broke. We slammed back down onto the track, but, fortunately, didn't fall off the stern. If we had, the bell would have plunged to the bottom, possibly severing the umbilical hoses that provided our breathing gases, electrical and hot water. If we had landed on the ship we probably wouldn't have had anything more serious than some bad jolts. If we had slid off the *Doria* and landed on the ocean bottom, the pressure differential might have sprung a leak somewhere filling up the bell with water. There was on-board gas, so we could have blown the water out and survived until divers hooked us up and retrieved the bell, but if one of us had been knocked unconscious there might have been a fatality.

While we were in the bell and they were making repairs, they didn't tell us that the cable had parted. The dive was aborted. Ted, Larry and Raul made a working run that afternoon after the cable was repaired.

Work was proceeding at an agonizingly slow pace. We needed some type of lifting device to scoop up the loose debris from down in the hole. The scrap was primarily little stuff that was difficult to lift. Moving timbers, pipes and large wreckage is easier because chains, or cable can be wrapped around sections of the stuff and it can be hauled out. We tried a couple of grabs that didn't work and finally settled on a piece of simple hurricane fencing about six by ten feet. Debris was scooped onto the fencing by hand, then both ends of the fencing lifted together to make an effective net.

At this point Drew Ruddy, one of the sat technicians and an enthusiastic "mud" diver, pressed down to give Ted a little relief. By now most of us were suffering

Illustration/Gil DiCicco



from colds and sore ears. In a closed atmosphere, when one person comes down with something, everybody gets it. Now we would have to have two teams. Ted, Raul and I would make up one team; Bob, Drew and Larry the other. It worked well. Bob would be able to film important things that Drew would be doing and I would be working closely with Ted.

Sunday, August 16. Incredible! Last night the captain moved the ship and no one slacked off the down lines, so they all broke, which means another day is wasted. Had four foot seas today, so we didn't get into the water. A long boring day.

Monday, August 17. Once again, bad weather. It's sunny, but we have six foot seas running. Some have been breaking over the chamber complex, sending a shuddering reverberation through the system.

More bad weather is heading our way from Hurricane Dennis, so Steve decided to start bringing us up. We began our ascent at 3:00 pm, coming up at eight feet per hour. Seas have been running six to eight feet with an occasional ten footer.

Tuesday, August 18. It's 6:00 am and we're holding at around 80 feet. Weather seems to have abated slightly, but still does not seem dividable.

I had been in sat for over two weeks now. It was time for Gimbel to press down and for me to keep coming up. I moved into the smaller chamber while the rest of the crew pressed back down to 150 feet. The weather had turned better and they went back to work. I didn't look forward to the rest of the ride up. Counting the time it would take the sat technicians to get the smaller chamber ready to move, plus my decompression time, meant it would be another two days before I could step out on deck. I wanted to stay in sat where the action was, but I knew how anxious Peter was to get in. As disappointed as I was at coming out, I was truly excited for Gimbel. He had gambled an awful lot on this project. He lives and breathes this kind of excitement, and his destiny seems to be bound up with the grand old lady lying on the bottom. Saturating would be as special for him as it was for Bob and I.

While decompressing I heard the good news. Drew was burrowing about eight feet down in a hole when he very calmly said to Steve over the coms:

"Steve, get Peter and Elga to the phones."

"What is it, Drew," Steve said, "do you have the safe?"

"Steve, get Peter and Elga to the phone."

"Drew, are you at the safe?" Steve repeated, somewhat exasperated.

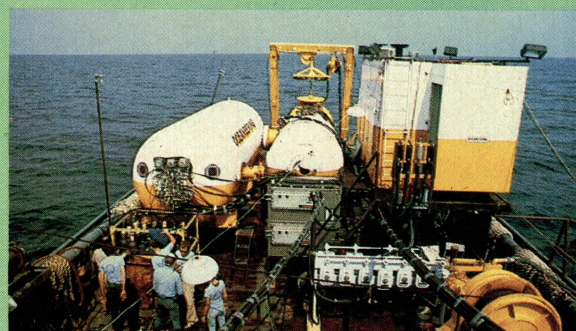
"Yes, I have my hand on the handle."

Finally, we hit pay dirt! It was the Bank of Rome safe. But the divers still had to remove a lot of debris and silt before they could haul it out. And, they discovered



photo/New York Aquarium

The Bank of Rome safe, recovered from the *Andrea Doria* after 25 years on the bottom of the Atlantic, waits unopened on the floor of the shark tank at the New York Aquarium. The safe will be opened when the film of the *Doria* expedition is premiered on television. Gimbel and Anderson share a light moment while posing with dishes recovered from the wreck. McKenney gets help with gear. The saturation complex. Diving bell being raised (opposite page).



photos/Mark Schreyer

that it was bolted securely to the floor and would have to be cut loose.

I stepped out into the cooling air and the abrasive noise of the machinery on my ears. In sat it had been quiet because we were insulated from the screaming generators on deck. The air felt good. I was looking forward to a standup shower and a proper sit down toilet. The sat toilet had been a product of some designer's nightmare. It was made of six inch diameter pipe and was cold and rusty.

Gimbel was getting ready to go into sat the following day. I would have to rest for 24 hours because a person is very weak while his body is adjusting to the different partial pressure of oxygen. With Drew locating the safe, the morale had lifted considerably and an electric energy seemed to surge through the ship.

All this time the press had been pestering us about whether or not we had the safe. It was pretty evident that interest lay with the treasure rather than the bulkhead door.

Thursday, August 20. Very weak today, so I had an hour's sleep this afternoon. Peter pressed down around 11:00 am, which was a mistake because the seas picked up and a second dive wasn't made. Peter must really be frustrated. The seas continue to pick up because of Hurricane Dennis. Early this

morning around 6:00 am we lost the port side winch. Some of the crew was up all night getting things squared away and tied down. Got up around 3:00 am to help out.

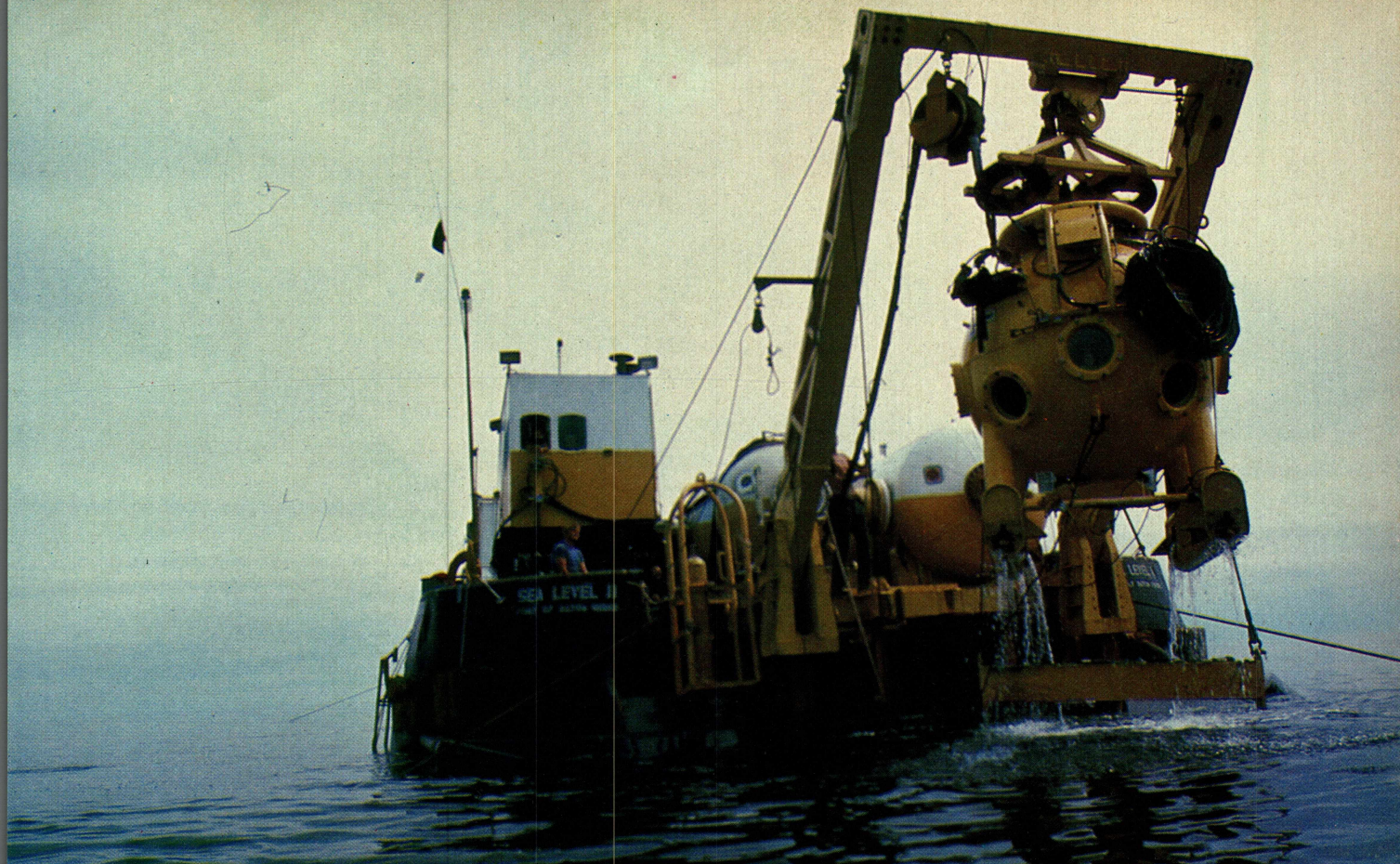
Friday, August 21. High seas running – about ten footers. Terrible conditions. No bell run.

The following day conditions improved, so a bell run was made and the divers started to cut the safe loose. At this point the *Doria* seemed to tenaciously hang onto the safe out of spite. Just when Drew got into position to begin cutting, the cutting torch would quit working, so it had to be brought up on deck for repairs. When Ted began cutting, the divers would have to abort because of severe bell bouncing. It was really frustrating. We were so close, yet so far away.

Monday, August 24. Drew, Hollis and Larry made a bell run. They spent about four hours in the water clearing and cutting, but had to abort about five minutes prior to slinging the safe because the bell was bouncing too much.

A fishing vessel has been hanging around for a couple of days, not fishing. We feel they're monitoring our radio and waiting to move in if we move off the site.

Tuesday, August 25. We got the safe! Ted and Peter dived and Ted shackled it up and out of the hole to the side of the



Doria. Peter filmed it leaving the hull. The weather has picked up with some eight foot seas battering us from the port side. John Buscemi dived to rig the safe with the bell wire. Nick and I filmed its ascent the rest of the way to the surface. Very surgy, but the water is fairly clear.

We located the safe on the 19th and got it on board the *Sea Level II* on the 25th. We didn't let the press know that we had located it for the simple reason that if we were forced to move off the site because of bad weather, someone else monitoring our radio calls might have moved in and got it. And short of an armed conflict there wasn't a thing we could legally do to prevent that from happening.

Meanwhile, Nick and I were scuba diving from the surface filming the bell and the divers exiting and working on the safe. Bob came out of sat and the three of us worked together. On one dive Bob and I swam along the boat davits then down over the superstructure to search for the builder's plate behind the smokestack. But, we couldn't find anything above the promenade deck level. We may have been too far to the stern and missed it, but we think the upper four decks, or at least large sections of these decks, including the smokestack, have fallen off. In '75 I swam out over the stack

and vividly remember its awesome size. It had been covered with fish nets and in the poor visibility I remember how scary it was dropping over the end of it and peering into the great black hole.

This could explain why Peter and I hadn't seen many fish nets on the first day we dived to it. Perhaps the weight of all those nets, combined with electrolytic action, caused this great section of the ship to finally break away and fall to the bottom. When you remember that the *Doria* is 700 feet long, and that for the most part we were groping around in 15 to 20 feet of visibility, it's easy to understand why we didn't realize until much later that something as massive as four decks and a smoke stack could be missing. In '68 the wheelhouse was intact. In '73 we discovered it had fallen away. In '75 the upper four decks were intact. Now, in '81, they appeared to be gone. The *Andrea Doria* was disintegrating. More and more, she was becoming a dangerous wreck to dive on, not something the average sport diver should play around with.

All this time Elga had been tirelessly working topside, running the operation while Peter was in sat. It was extremely difficult for her, simply because she was a woman. The crew of macho male divers weren't used to responding to the orders,

suggestions, or requests of a woman. I had to admire her stamina and coolness under the strain.

From the beginning Elga didn't want Peter to go back to the *Doria*. She knew it was dangerous. In '75 Peter had experienced an O₂ hit while decompressing and almost died. The quick action of his dive partner and the crew saved him. Elga couldn't understand the fascination this wreck continued to have for Peter. But Gimbel's destiny seemed interwoven with this massive shipwreck, and I knew that Elga wanted to understand it if she could.

She came to me one day and said, "Jack, do you think I could make a dive on the wreck?"

"Yes," I said, "I think you can."

It was a good idea. As far as I knew only one other woman, Evelyn Dudas, had dived the *Doria*. Elga had done a lot of Caribbean diving, some of it deep. Peter had taken her to another East Coast wreck, the *Stolt Dagali*, a couple of years ago to experience cold, dark and deep-water diving. She hadn't liked it.

We also realized Elga's dive could make a nice sequence for the film. An audience could empathize with her and see through her eyes how difficult and foreboding diving the *Doria* could be. Elga is not a big woman. She weighs

about 105 pounds soaking wet.

We made a preliminary dive down the bell wire to 130 feet, when conditions were good. There was no current and the water was relatively clear. Now that we had the safe up on deck, the conditions on the Atlantic had improved considerably. On a practice dive, we descended together and Elga did very well. I took her down to where we could just make out the bell on the bottom and then we surfaced. She was thrilled!

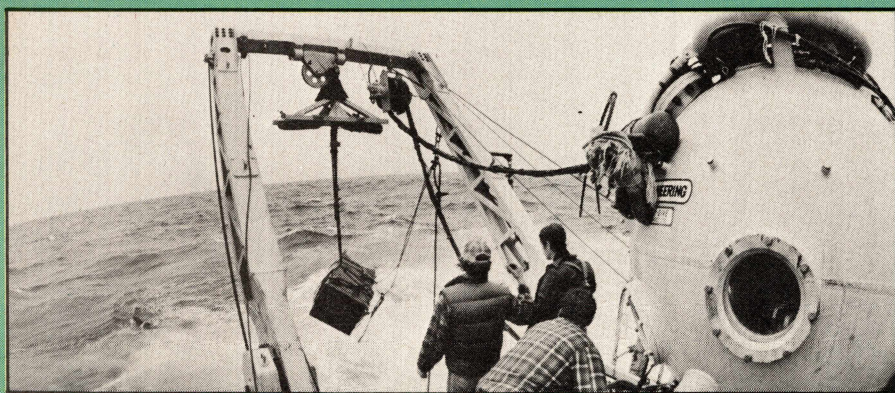
In the beginning, Peter wasn't too keen about his wife's idea but when he heard how well she had done his enthusiasm improved. For the filming we planned for Elga and I to descend to the hull, providing conditions remained good. Peter

spect from the crew after that.

On August 30, John Lindley and I left aboard the *Provider III* for the 13 hour trip back to Montauk. John had a new television series that he had to be back for and I was committed to a film project in the Sea of Cortez. Meanwhile Peter and Ted made some long excursions into the engine room after cutting a hole through the ventilator shaft in the first class foyer. They discovered the damage to be so extensive inside that they couldn't have recognized the bulkhead door between the deep tank compartment and the generator room if they had been standing on it. They made a connection all the way through to a sandy sea floor from the inside, also coming into the wreck from the

by Peter, Bob, Nick and I. Thousands of tape recordings had been made and Mark Schreyer had shot over 3000 still pictures. The *Doria* had been well documented, and now Peter and Elga, along with their editor, faced the formidable task of cutting it down to a 90 minute program. It is to be shown on TV this month.

As far as some of us are concerned, the *Andrea Doria* is now a closed book. I have made 49 very exciting dives on the wreck. Peter's involvement with her has spanned 25 years. The wreck is rapidly breaking down and Peter, Bob and I feel we have seen enough of her. It is time to let the old-girl rest in peace. For us, it really was: *Andrea Doria: The Final Chapter*. ▶



The topside crew hauls the Bank of Rome safe aboard the support vessel *Sea Level II*.

photo/Mark Schreyer

would be waiting there to meet us. Bob and Nick would film the descent. We hoisted the heavy doubles onto Elga's back and entered the water. Conditions were still good: No current and visibility about 30 to 40 feet. It went like clockwork. Elga touched the bell and then settled to the hull of the ship where Peter was waiting for her. I was probably more nervous than she was. Bob, Nick and I had octopus regulators, so I felt that between the three of us we could handle any emergency she might have.

My great concern really wasn't necessary. She did exceptionally well and enjoyed every minute of it. Peter took her over to the hole through which we had extracted the safe and she plopped right in. I grabbed her tank yoke and pulled her out. Our dive was planned to only 160 feet. Elga then made a beeline for the promenade deck and swam to the rim of an observation wing that is still in place. Trying to keep up with her, shoot still pictures of her and Peter, and to be sure that Bob and Nick were getting it all on film kept me pretty busy. Aside from getting cold during her decompression she was very excited about what she had done. It was a great treat for her. She had been under tremendous strain with Peter in sat, and I think she gained a lot of re-

outside. The generator room had been massively breached: it was wide open to the sea.

Time was running out. Now that we had been successful in getting the Bank of Rome safe out, and Peter had solved the mystery of why the generator room began to flood immediately after the crash, Ted, Peter, Raul, Drew and Larry wanted to go after the other safe. After all the hard work and setbacks we had experienced, the divers felt a renewed surge of optimism and wanted to extend the expedition for a few days if necessary to extract the purser's safe. However, no matter how good the weather and water conditions were at the present time, we were short of fresh water, which created a ballasting problem on board the ship, and we felt certain that Murphy would rear his ugly head once again as soon as the divers got close to the second prize.

On September 2 the expedition came to an end and the *Sea Level II* returned to Montauk. The safe was inspected by customs, but left unopened, and was deposited in the shark tank at the New York Aquarium at Coney Island. It will not be opened until the film is premiered on television.

About 100,000 feet of film had been exposed, 24,000 feet of it shot underwater

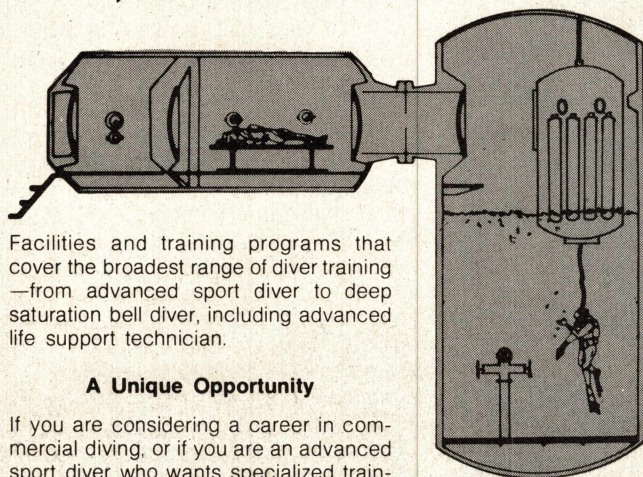
A HEROIC EFFORT BY PETER GIMBEL

I don't believe that Jack, Bob or myself had ever experienced so much trouble in putting down lines on the Andrea Doria. The line that Jack and I tied off during our identification dive had been torn away during the mooring operation. Two days later we still did not have a cable shackled at the hole Hollis had cut into the foyer in 1973, and our decom meters were running at a shocking rate. Bob and Nick, diving in a bad current with visibility down to around ten feet, managed to secure a polypropylene line at a point they figured was only about 30 feet away from the hole. They were hose diving and it was terrible work dragging those long umbilicals in a current.

Jack made the next effort, diving alone. He, too, was surface-supplied, and as with all the dives until we went into saturation, his gas mix was straight air. Jack took with him a 40 foot rope that he tied off to the bottom of the line Bob and Nick had set. He was to fan out in ever widening circles until he located the hole. Then, he was to haul a heavy cable over and shackle it in next to the hole. It was a lot to accomplish in one half hour, working alone and diving on air, but Jack got the job done — every last bit of it. The assignment would have been difficult in the time allotted even under the best of circumstances and the conditions that Jack faced were terrible.

I shall always think of that dive as pivotal to the operation and truly a heroic performance. Jack is too modest to have even mentioned this episode in his article, but Elga and I felt it was an omission that had to be corrected.

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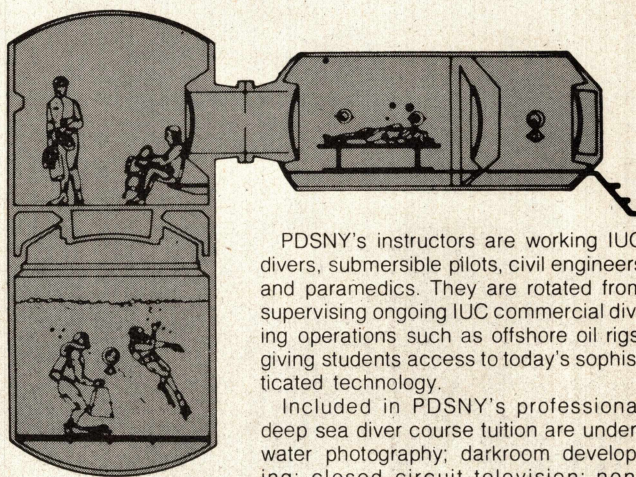
Professional training at the North American Hyperbaric Center will give you the experience you need in the field, with exposure that duplicates your future job. Saturation dives to 400 feet and topside workshifts are an integral part of the program.

At the present time, 80% of PDSNY's graduate divers are employed by IUC or IUC International, Inc., and are involved in offshore oil exploration and production, marine inspections, salvage, and submersible operations in Indonesia, the North Sea, the Mediterranean, the Gulf of Mexico, and off the coast of West Africa.

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PDSNY's instructors are working IUC divers, submersible pilots, civil engineers and paramedics. They are rotated from supervising ongoing IUC commercial diving operations such as offshore oil rigs, giving students access to today's sophisticated technology.

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CONSELF SUPREME

(Continued from Page 49)

Routine maintenance should be no more involved than that suggested for any good regulator: rinsing in fresh water after use, and drying out of direct sunlight. Annual service by an authorized Aqua-Lung service dealer is not just recommended, but required in order to keep the original-owner lifetime limited warranty in effect.

The Conshelf XIV (Catalog No. 1081) currently retails for \$240 (U.S.) and the Conshelf Supreme for \$255. For divers who already have a Conshelf (models XIV, or the earlier versions, VII, XI and XII), U.S. Divers has a conversion kit (Catalog No. 1088-50) available for about \$55, which can transform any of these models into an "all environment regulator," like the Supreme. And if your Supreme only needs an oil change, U.S. Divers can supply that too — Catalog No. 1088-55 for a two ounce refill.

Considering the long and successful history of the Conshelf regulators, their heavy construction, their rather simple design, and how these features can impact dependability and maintenance, experiencing their breathing characteristics, and recalling how well the Conshelf did in the NEDU test, it is not much of a surprise to learn that "the Conshelf regulator is being used by more navies than any other regulator."

EXPLORING THE DEEP FRONTIER

The exhibition, Exploring the Deep Frontier, is now at the John G. Shedd Aquarium in Chicago, IL. It will continue until September 30. Presented by the California Academy of Sciences and the National Geographic Society, the exhibit features photomurals, artifacts, models and audio/visual clips.

Exploring the Deep Frontier is divided into six sections: Water, Essence of Life reveals the magic of the sea with words, music and photographic images. Into the Depths describes the history of diving. The Lure of the Sea details why man dives. Extending the Deep Horizon describes the latest in underwater technology. Reaching the Limits describes more than 50 underwater habitats. An Ocean Ethic (a film) shows a ballet of underwater life set to music.

Dr. Sylvia Earle's book, *Exploring the Deep Frontier*, on which the exhibit is based, is on sale in the Aquarium gift shop, and during daily feedings in the Aquarium's 90,000 gallon Coral Reef, a diver talks to visitors through a microphone in his mask.

For further information and exhibit hours (which change, depending on the month) contact the John G. Shedd Aquarium, 1200 South Lake Shore Drive, Chicago, IL 60605; (312) 939-2426.

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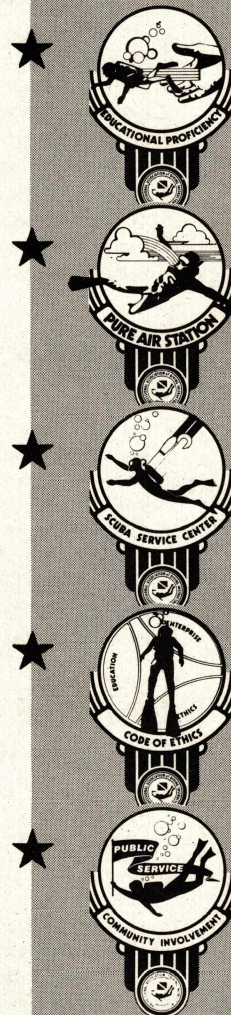
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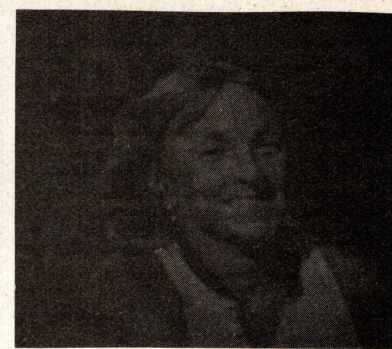
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By Amy Brown

Cozumel

Fastest Boats to Palancar.

Cozumel, a twenty eight by three mile white and green speckled island in a sea of azure blue, sits twelve miles off the Yucatan. The balmy climate, lush eye-catching vegetation, estimable beaches and incomparable coral reefs have established Cozumel as a major international resort in the diving community. Within easy access are fascinating archaeological sites of the Mayan civilization.

With the opening of an airport in 1961 on the verdant island, and direct air service from many major cities, Cozumel slowly and casually evolved into a mecca for travelers to the Yucatan. The hotels strung along the island's western, leeward side are an indication of its growth. In many instances, however, management and service have neglected to keep pace with the demands of visitors. Pancho Morales and Robert Wohlers, owners/managers of the LaCeiba Beach Hotel and Fantasia Divers respectively, are an exception. Together, they provide divers with a vacation free of aggravation, which has become commonplace on the island. Accommodations at LaCeiba are comfortable and convenient, with Paradise Reef just off shore.

Some years ago cinematographer Ramon Bravo towed a cargo plane off shore of LaCeiba as a movie prop. Project completed, Pancho Morales arranged to have the plane left as an artificial reef. The airplane is just beyond two limestone ledges, which run parallel to shore, ten to twenty yards from the beach. A petting zoo of marine life is harbored in between the two ledges and surrounding the plane. Sergeant-majors, parrot fish, stone crabs and small morays are among the inhabitants. While it is true that much of the marine life on Palancar Reef has headed for deeper waters due to imprudent spearfishing and careless anchoring by fishing and dive boats, the area off of LaCeiba remains untouched.

Palancar, Santa Rosa, and Paraiso Reefs are synonymous with Cozumel and are but a twenty to thirty minute boat ride from LaCeiba, thanks to Fantasia Divers, an American owned and operated dive facility. Their new and modern dive boats eliminate the tedious trips on the older boats to the dive sites. All equipment and boats comply with American safety standards.

Finally, the expedient reservations system via in-house telex with OceanQuest, avoids the problem of lost reservations and over booking, which has plagued other resorts on the island. LaCeiba Beach Hotel and Fantasia Divers have a marriage that provides divers with the best that Cozumel can offer.

Mexicana Airlines has frequent service from Miami to Cozumel. Direct service is available from some major cities via United Airlines. Packages include all gratuities and Mexican island tax. Land and air reservations arranged by OceanQuest Inc., 139 Woodlawn Avenue, Upper Montclair, New Jersey 07043. Call toll free 800/526-1394 or 201/744-5254.

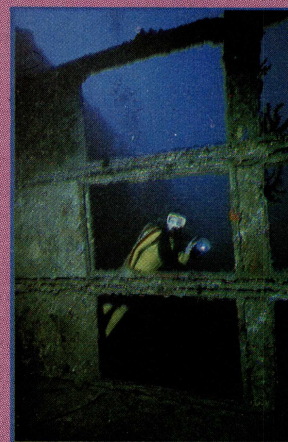
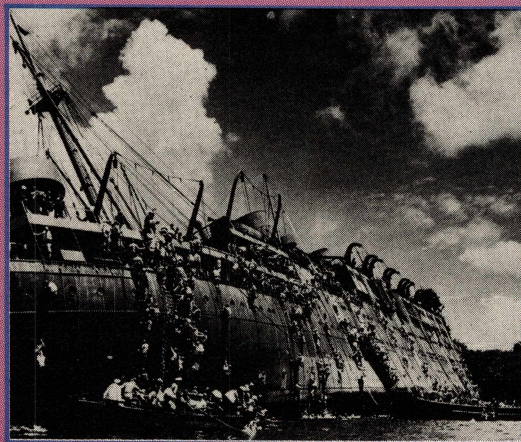
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SECTION

At the eastern end of Australia's Coral Sea lies the new Republic of Vanuatu, known until recent independence as the New Hebrides. These "Islands of Coral and Ashes" are noted for their geologic activity, with two active volcanoes, Tanna and Ambrym, spewing black clouds of pumice constantly.

One of Vanuatu's sublime under-sea thrills is the immense, somber wreck of the S.S. *President Coolidge*. In 1942, the *Coolidge* was sent out from its home base in Luganville with 4000 marines under sealed orders. Long gone were her elegant paint and decorations; they were covered with



VOLCANIC VANUATU'S COLOSSAL SS COOLIDGE

**Text and Photography
By Carl Roessler**



gloomy wartime gray.

An intelligence-intercepted message warned of a Japanese submarine wolfpack, so the *Coolidge* turned back. By some terrible mischance, she hit two mines while re-entering the harbor.

Today, off a rich coral shallows, she lies in water 60 to 300 feet deep. Her upper reaches are easily dived; while her deeper caverns are best left to the professional salvage divers who have been her only companions through her 40 year wait.

Nearly twice the length of many Truk Lagoon wrecks, the *Coolidge* is a colossal shadowy presence which dwarfs human visitors. The empty windows of her massive bridge wings

gape as if in shocked surprise at her sudden fate. In the gloom that surrounds her, occasional barracuda, eagle rays, turtles, batfish and other wanderers pass, their silence a kind of commiseration with her final tragedy.

Wandering her halls, we find helmets, gas masks and other detritus of war. In a deep salon, a statue of a stylized Godiva and horse still gleam in like-new paint; few lights have touched the lady's colors in four decades.

The *Coolidge*'s forward gun has to be one of the great photo props of the sea, a ghostly reminder of her glory, and a sad commentary on the futility of her end. Wandering through forests

of tree coral, we find lionfish, tiny soft corals, gorgonians and hosts of tropical reef fish. Still, it is the immense bulk of the *Coolidge* itself that draws us inexorably onward.

It is with the greatest reluctance and regret that we realize we must leave her. The decompression tables are unforgiving, and if we want to dive her tomorrow, we must withdraw today.

In the sun, on the beach, it takes an hour for the excitement to pass; the conversation is a gabble as we each recall highlights of the experience.

The *Coolidge* is deep enough to allow only one full dive each day, so our other two dives are at other attractions nearby — beautiful coral gar-

VOLCANIC VANUATU

dens, and the exotic oddity known as Million Dollar Point. This astonishing undersea avalanche of war material is the legacy of a stubborn American commander. At the end of the war, the U.S. Government asked the French and British governing authorities here to bid on the enormous inventory of trucks, tractors, cranes, etc., to be left on the island. The clever administrators knew that the Americans would leave the prized items anyway, so they smugly bid nothing.

The American commander, bless his iron heart, ran the stuff off the beach into the ocean; today it is an evocative, surrealistic seascape of tumbled wreckage extending down 200 feet or more. Big groupers use the wreckage as home, and eye us without fear as we soar above the mind-bending wreckage. Immense ten-wheeled trucks, huge tractors, and the spidery girders of tall cranes form an iron labyrinth unlike any other reef in the sea.

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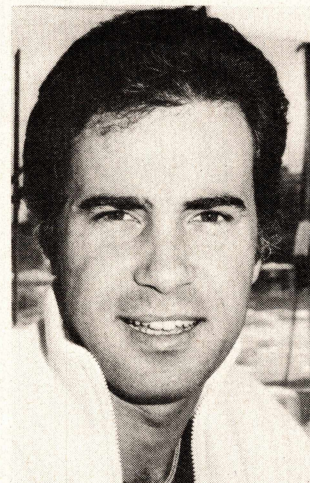
For information write: Suwannee River Dive Company, 1976 Blackwood Avenue, Winter Garden, Florida 32787; or phone (305) 299-5233. 🐠

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tion rights to anyone any year, or exchange trips with other time-share vacation programs, or they can sell their membership at anytime for profit. The cost of buying into SeaTrek, according to



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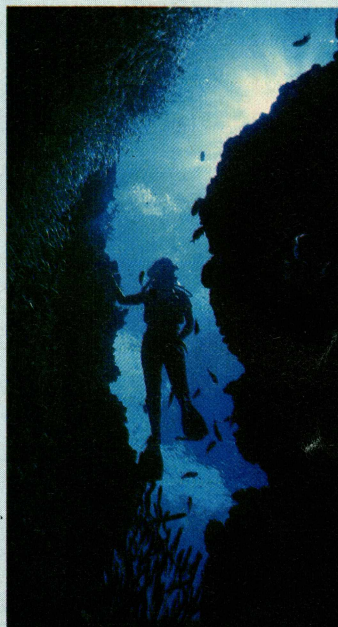


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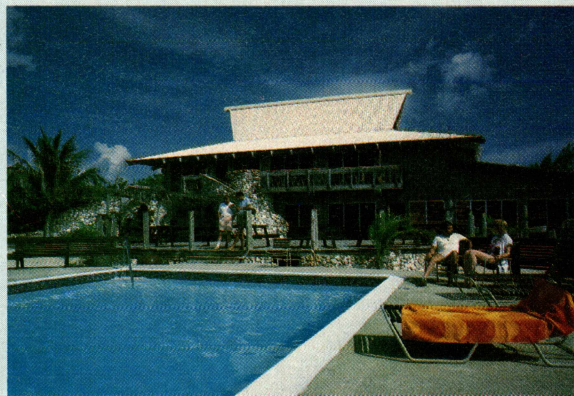


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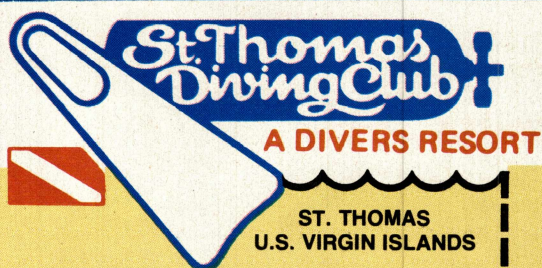
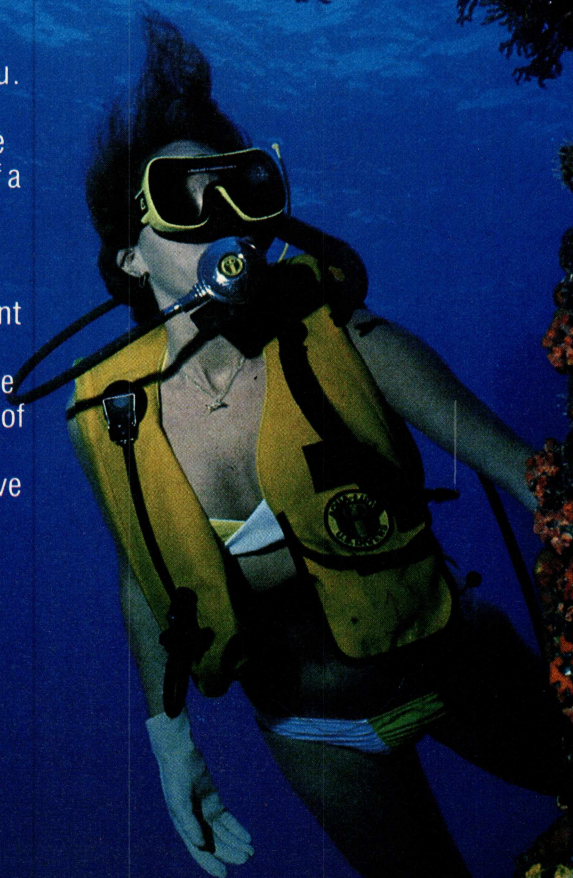
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Little Cayman is served by regular flights via Cayman Brac on Cayman Airways' 17 passenger Trislander. Special packages and day excursions are being arranged by Pirates Point with Executive Air Services charter operation on Grand Cayman.

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Cayman Airways has daily jet service to Grand Cayman from Miami, three times weekly from Houston, and twice weekly from Kingston, Jamaica. Inter island services are offered daily. ✈

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This is the third year that SEA will sponsor this program at Puerto Morelos, Yucatan, Mexico. Students will snorkel and dive with their instructors on the extensive barrier reef offshore, visit Mayan archaeological sites, and study the terrestrial biology of the Yucatan.

Teachers not certified in scuba will have the option of taking a complete certification course prior to the actual teacher institute, right at the Yucatan site. Four graduate credits will be offered to those completing the program.

For additional information contact Jere Hallenbeck, Executive Director, SEA International, 1425 Erie Blvd. East, Syracuse, New York 13210. ✈



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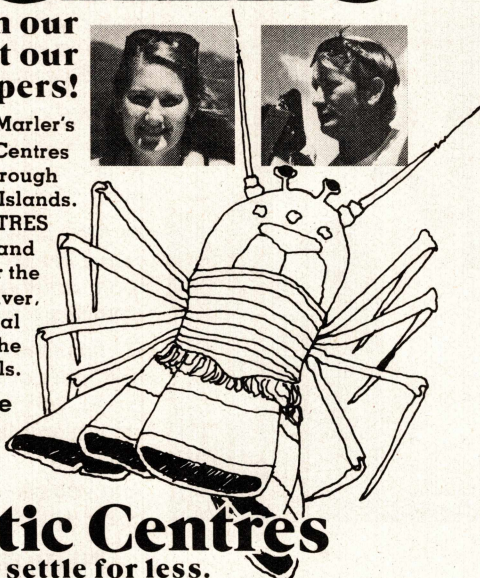
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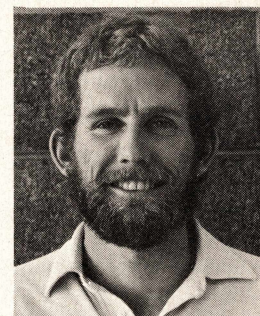
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taining laboratory dive equipment. John
has been a research diver since 1976,
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ceived his BS in biological sciences from
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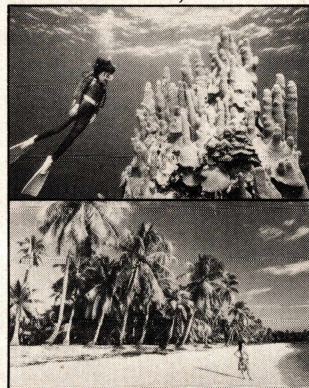
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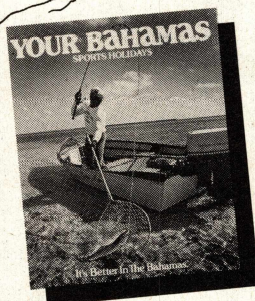
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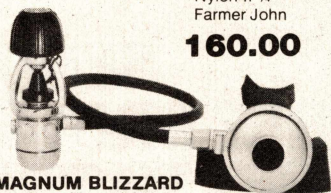


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UMS MEETING

The annual meeting of the Undersea Medical Society, Inc., will be held June 1-5 at the Omni International Hotel, Norfolk, VA.

Opening the scientific sessions on Wednesday, June 2, will be a symposium on diving safety. It will be dedicated to the memory of Charlie Brown, who died last July. Paul Tzimoulis, editor/publisher of SKIN DIVER Magazine, will offer an eulogy.

A highlight of the meeting will be the Suzanne Kronheim Memorial Lecture June 4, presented by Dr. John Dwyer of Yale University. His topic will be Understanding Modern Immunology: the Second most Fascinating System in Biology.

Among other subjects on the agenda are respiratory limitations in deep diving, decompression sickness, the high pressure nervous syndrome, one atmosphere diving systems and air ambulances.

Not all the exchange of information will be inside classrooms; there will be pool-side demonstrations of diving and resuscitation techniques.

At the banquet June 4, several annual awards for contributions to the diving community will be presented.

For further information contact: C. W. Shilling, M.D., 9650 Rockville Pike, Bethesda, MD 20814; (301) 530-9225.

YMCA CONVENTION/ CRUISE

The National YMCA Underwater Activities Convention will return to the Casa Marina Marriott Resort in Key West, Florida on June 25-28. The program will begin with a reception in the exhibits and art display area on Friday evening. A broad range of technical papers will be presented on Saturday and Sunday, interspersed with workshops on issues of current interest to divers and instructors. General sessions will cap the convention on Monday morning.

For information write: Convention, National YMCA Center for Underwater Activities, P.O. Box 1547, Key West, Florida 33040; or call (305) 294-5288.

After the convention, there will be an education and diving expedition aboard the *R/V Coral Reef*. Departing June 28 and returning July 5, the expedition's destination is Bimini. Dr. Rena Bonem will conduct a course in coral reef ecology.

The package includes: round trip cruise from Miami, food and beverages, unlimited diving, use of sailing dinghy and fishing equipment, and YMCA Coral Reef certification (if qualified). The cost of the package is \$730-\$800.

For information contact Shirley Kelley, 1405 Horsepen Pl., Raleigh, NC 27609; or phone (919) 872-6145.



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Paul Tzimoulis, Editor, Skin Diver Magazine

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RON & VALERIE TAYLOR

(Continued from Page 26)

the summer of 1980, while filming Those Amazing Animals off Southern California, that Valerie was bitten by a blue shark. (See Anatomy of a Shark Bite, SDM April, 1981.) The entire episode was broadcast across the nation on TV. Following that incident, Ron and Valerie were in the Coral Sea to test a revolutionary new shark-proof suit of Ron's design. (A heavy metallic mesh material, it is featured in the May, 1981 issue of National Geographic and in the October 1981 SDM.) During the Coral Sea tests Valerie allowed herself to be bitten repeatedly, and suffered no ill effects. During one test swim, however, she suffered a freak accident: she swam into the middle of a shark feeding frenzy and a shark bit her in the head. Although the mesh hood protected her head, the shark managed to lodge its teeth under her chin. Valerie described it as feeling like a "tremendous sock in the jaw," and she emerged from that particular dive calm and collected, even smiling. After all, the whole ordeal had only gone to prove that the shark suit really worked. Better yet, Ron had gotten it all on film. What more could one want?

SDM: Valerie, what happened when you were bitten on the face? Where were you?

Valerie: Marion Reef, at Action Point. Not very deep — 15 to 25 feet. We were working on a film for ourselves. We had just gone out and we were on the edge of this drop-off. There were quite a few sharks cruising around and I had this tuna, holding it in my arms. If there's anything sharks love, it's tuna. I thought I'd just swim out and see how they reacted to me with the tuna, in the middle of a frenzy. Alexander, our assistant, had speared a fish and the sharks were quivering all over it. Ron had started to film and I swam out toward them, launched myself into the middle. Suddenly I could feel the shark at my face and I lost my regulator, had trouble, so I surfaced. I had trouble there but I found my regulator, put it in my mouth, and once I got the air I sunk back down and lay on the bottom. I'd been punched in the jaw very, very hard. I sunk back down and tried to slow everything down. I was hyperventilating like crazy.

SDM: Ron, what were you doing while this went on?

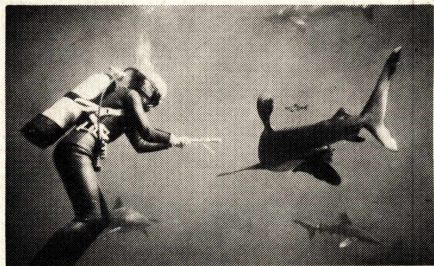
Ron: Filming. I didn't know Valerie had been hit until she went to the surface and I could see blood coming out from underneath her chin. When I'm filming I'm not looking at the specific detail of what's happening. I'm getting all the action in the frame, so my eye is constantly flicking across that area to make sure I've got the composition correct. And I never know

what detail I've got until I look at the work print on the editing machine. So I didn't know what had happened.

SDM: Exactly how did the shark get its mouth around your face?

Valerie: Well, I don't know. I felt a tremendous hit. At the same time the teeth hit the mesh of the suit and there was a crunching, grating sound and it was right across my ears. It sounded like it was tearing off my face. It was all very fast.

Ron: The shark is a very, very quick animal. I saw Valerie swimming toward this milling mess of sharks and then suddenly



photo/Peter Lake

she turned around and was coming back toward me. It happened in a couple of seconds.

SDM: You are reported to have a sixth sense with animals, including sharks, and you have previously talked about a mental process you go through when you're with sharks in the water.

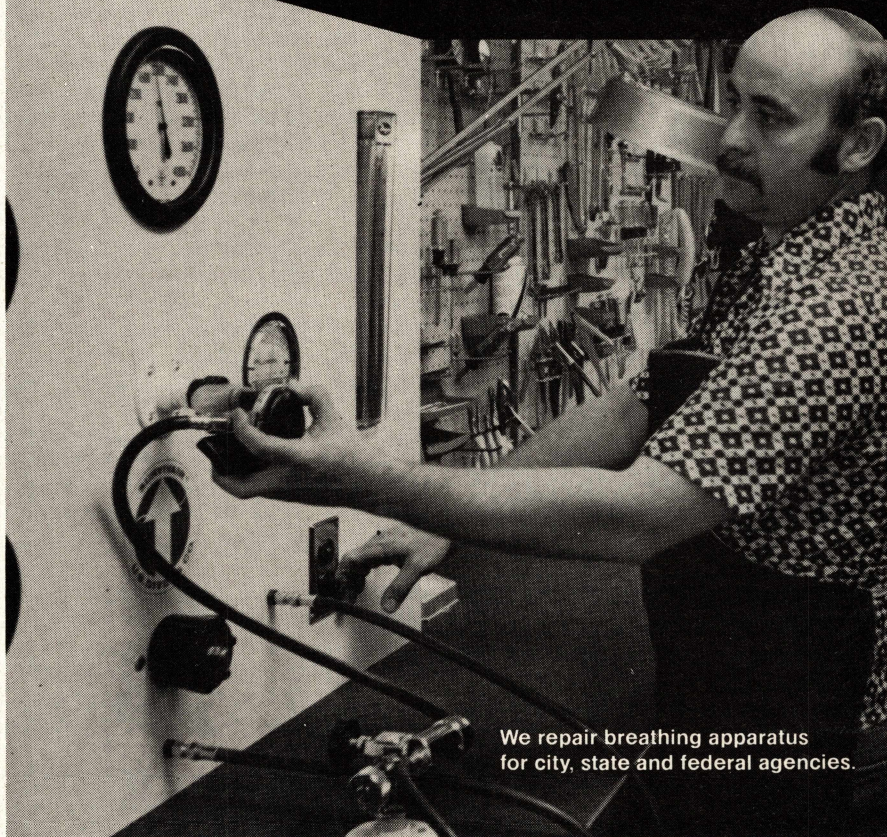
Valerie: Well, it was Ron who first put me onto it, years and years ago, before we were married. You were spearfishing, Ron, and you said if you want fish, think about it hard. In Australian spearfishing competition you have to get one of each species and there are several species. Ron told me to think — think and concentrate — on that fish and I'd find it. I found that this worked and I've stuck with this ever since.

SDM: You also have a similar positive mental process that you use with sharks, don't you?

Valerie: Yes. When I see a shark and it sees me — once we've looked at each other — then I have an understanding with that shark. "All right, mate," I say, "you keep your distance and we'll get along fine." I don't know what he thinks, but he'll come back and he'll look and look — it's the same with fish. They have no eyelids so they always seem to be staring you in the eye. There is definite contact there. Just because marine animals don't look the same way humans do doesn't mean they don't look. Just because they don't feel pain the same way we do doesn't mean they don't feel pain. Those animals — especially the sharks — have been here for millions of years and we're just evolving. We judge everything by ourselves and perhaps we shouldn't.

SDM: This eye-to-eye contact with sharks, you said one time that if you can establish this eye contact you're all right, that it's what you can't see that causes trouble.

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Valerie: Yes; that's right. If I look at that shark then it's all right. We come to some sort of an understanding with each other. I know of nobody who has been attacked who saw the shark before. A shark may come very close and appear very menacing but nothing has ever happened when it's being looked at. You're standing up to that animal on its own grounds and saying, "Mate, I'm as big as you are."

SDM: I have heard that you spend considerable time before a dive thinking about it.

Ron: I try to plan everything, make sure we don't make mistakes, try to see what problems might occur and take the necessary precautions. It's a matter of understanding the power of positive thought. If you think you're going to do something, then go about it in a positive way.

SDM: You get a mental image — see it before you do it?

Ron: Yes, that's it exactly.

SDM: You never go down and just say, "Whatever happens, happens?"

Ron: Basically I've got a plan. Sometimes I go down with no idea of what's going to happen. In that case my mind is completely open.

Valerie: I've worked with Ron long enough to know what he would like me to do — how he would want it to happen. So now I know if I do my bit he will do his bit and it will all work out very well . . . I try to bring the sharks around to where Ron can film them.

SDM: You're busy all the time with underwater projects and you don't have any problem making a living at it?

Ron: We've got more work than we can handle.

SDM: And you're supposedly removed from the rest of the world — in Australia — and that poses no problem?

Ron: It's an advantage, because we have the marine life here. Australia is a big country with a small population. Our area hasn't been exploited to the same extent as other parts of the world. We wouldn't be able to make a living in the Mediterranean, for example, because it's dead by comparison to the area we live in. We're lucky to have such a variety of exotic marine life around Australia.

SDM: What is your favorite kind of work? Is it your own documentary films, or do you like the fiction, drama, aspect of Hollywood projects?

Ron: I like a variety.

Valerie: I think what I'd like the most is if someone gave us a lot of money and let us go out and make really fine underwater documentaries. We always seem to be on shoestring budgets and everybody's pushing. There's not enough

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time, not enough money. What we'd like to do is shoot a really nice hour special on night and day on the Barrier Reef, or marine life in the Southern Ocean, or pearl divers, or something. Something where we could go into it properly and carefully, take our time and make the most of it.

Ron: I like working with different marine creatures, having different challenges and experiences. Probably the most exciting thing is working with the great white shark. *Blue Water - White Death* was a tremendous experience — the tops.

Valerie: Yes, I think the top experience of my life was *Blue Water - White Death*, as far as diving goes.

SDM: In all of your sea work, do sharks take the largest percentage of your time and film?

Ron: That's what the present demand is — for our stock footage of sharks. There was talk of a series to dispel the myths concerning sharks. Following *Jaws*, we were contacted to shoot footage on sharks to tell the real story, but the editors and scriptwriters still felt compelled to dramatize the great danger of sharks in this documentary.

Valerie: The American public is brought up to have everything overdramatized on television . . .

Ron: Even the cartoons, even cartoon characters, have to be smashed or flattened or pulverized — violence. In the

shark footage, they want . . .

Valerie: . . . injury or drama.

SDM: When you get an assignment, how do you work it?

Ron: I do the camera work and Valerie does the arranging, organizing, chums up the marine creatures . . .

Valerie: . . . and make sure they do all the right things.

SDM: There is an aura about you two, a perfect relationship, a married partnership that works.

Valerie: It takes a long time, it doesn't happen by magic. It takes years and years of work. If we're down together and I see something I can do something with, I let Ron know. And Ron knows I'll do the right thing. I take photographs and I do for Ron what I'd like someone to do for me.

SDM: How about writing? Do you have any plans for that?

Valerie: I'd like to re-do *Underwater World*, do it properly, but I don't seem to get the time.

Ron: I'd like to do a giant picture book on sharks. Our publisher, Giniger, is also after a book on underwater photography — which I would like to do. But, it's an enormous task — a good book on underwater photography, with all the angles, all the tricks.

SDM: It would seem that such a book would involve a lot more than f stops and lenses.

Ron: Yes.

Valerie: Ron has given a lot to underwater photography. As far as I know we were the very first people to use lights underwater for movie photography — mobile lights. And macrophotography — back in 1969 or 1970, Ron dreamed up this idea and he made me these prongs to go on the Nikonos. And he said, "Don't ever let anyone see this: You'll get the best underwater photographs and no



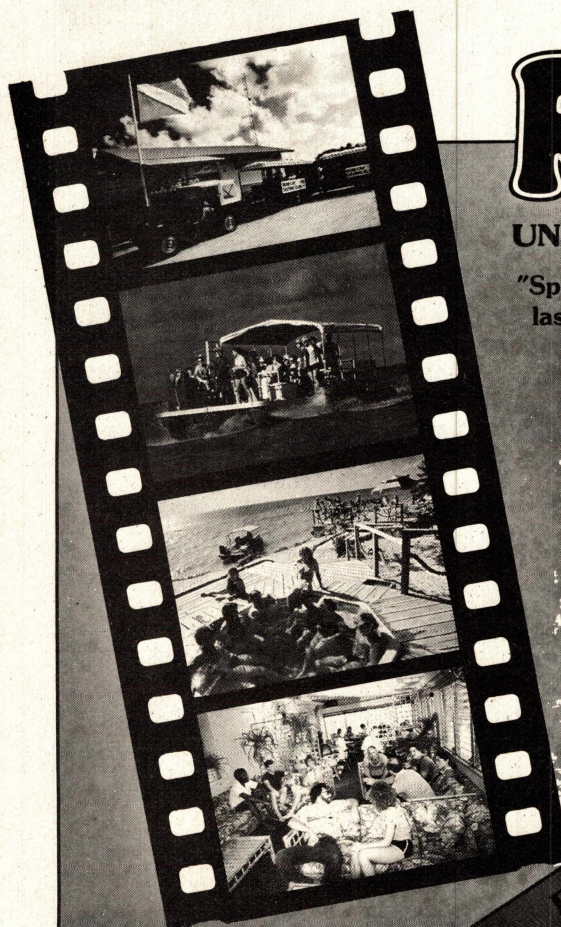
photo/courtesy Ron Taylor Films

one will ever know how you do it." So for about a year I had it all to myself. Then there was an article in *SKIN DIVER Magazine* about them. Someone had started making close-up prongs about the same time Ron came up with the idea.

Ron: It wasn't a matter of someone copying my idea.

SDM: A parallel development?

Ron: Yes. Look at ancient civilizations. The Incas and Egyptians, they both came up with calendars at the same time. There can be an idea that travels all around, and conditions are such that the people are ready for that idea.



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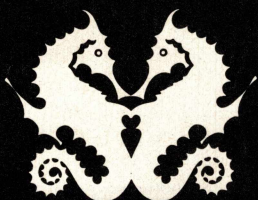
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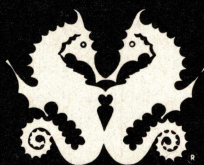
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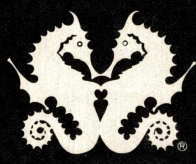
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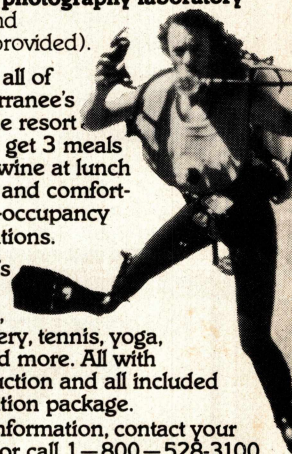
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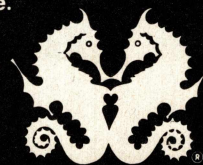
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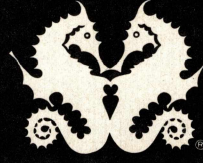
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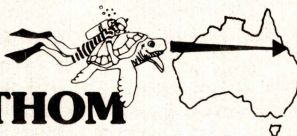
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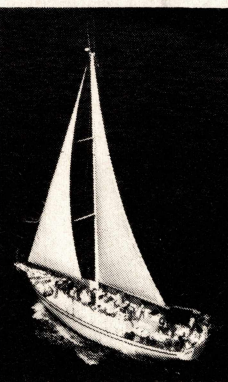


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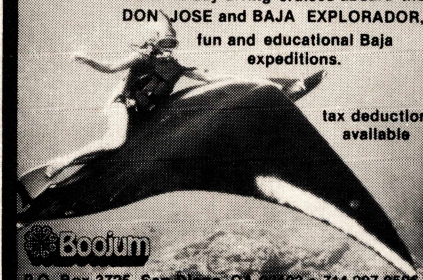
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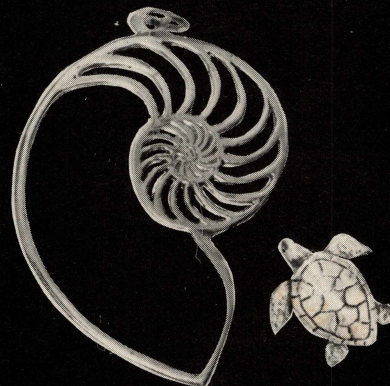
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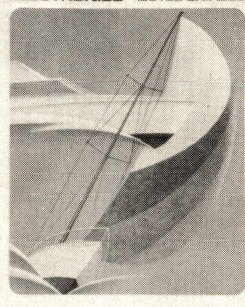
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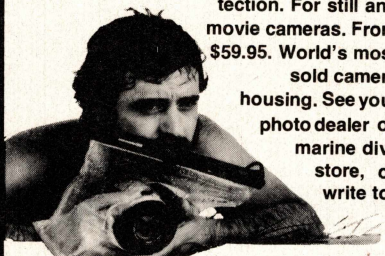
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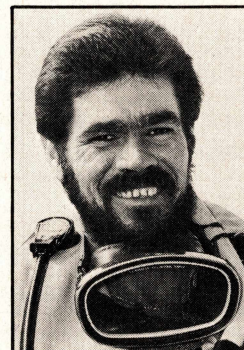
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ANTHONY'S KEY EXPANSION

Anthony's Key Resort, on the island of Roatan in the Western Caribbean, has begun an extensive campaign aimed at the dive travel market. Peter Hughes,



well known dive operations specialist of Dive Bonaire, has taken charge of the Anthony's Key aquatics program.

New owner/managers Julio Galindo and Luey McLaughlin have undertaken a refurbishing of the resort and an expansion program. Currently AKR can host 60 guests in 30 bungalows nestled in tropical foliage. Divers can anticipate a wide



variety of sites including shallow reefs, reef caves, wide canyons, walls, pillar coral formations and fish life. Non-diving activities include tennis, horseback riding, sailing, windsurfing and beach picnics.

Pat Koch, who has been with AKR throughout its 14 year history, will remain as director of public relations at her Texas office. Midwest travel specialist, Dave Brock, will provide a second state-side office for information and bookings. Write or call Anthony's Key Resort at 3803 Wagonwheel Court, Plano, Texas 75023; (800) 527-4319 — or P.O. Box 26556, St. Louis Park, MN 55426; (800) 328-0734; MN (612) 546-5688.

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Diving and a picnic await divers who schedule the special full-day excursion with Dive Bonaire/Flamingo Beach Hotel every week to areas around Klein (Little) Bonaire.

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snorkelers will be permitted only if there is room.

Following a full morning of diving, the group sets sail for No Name Beach for a picnic lunch. A full array of cold cuts will be provided as well as potato salad, cole slaw, fruits and beverages to include beer, iced tea and soda; all prepared by the Flamingo Beach Hotel kitchens.

After a brief rest while the boat returns to fill tanks, the excursion continues on for a full afternoon of diving and returns to the hotel around 4:30 pm.

The charge for the Dive Bonaire/Flamingo Beach Hotel picnic is \$6 per person plus the regular diving charge. For more information, contact the Flamingo Beach Hotel, 520 W. State St., Ithaca, NY 14850. Or, call toll free (800) 847-7198; in NY state, (800) 252-6323.

CATALINA CLEANUP

This year's underwater cleanup of Avalon Harbor and Lover's Cove (Catalina Island, CA) was the most extensive and successful yet held. In addition to the usual cans and bottles, the 66 volunteer divers brought up shopping carts, watches, anchors, propellers, tires, batteries, parts of boats, tools, clothes, knives, fishing poles, jewelry, skin diving equipment, plus a full bottle of beer, a toilet pump, a pulley, a vacuum cleaner and a set of deer antlers.

Local divers and members of mainland dive clubs participated in the project and local businesses offered prizes and assistance. Prizes were also given by Jeppesen-Sanderson, NAUI, Scubapro and SSI.

Both islanders and tourists were on hand to watch the wet masses of trash come ashore as divers proudly surfaced with their "treasures." Many islanders who do not dive, but think it is a great idea to clean up the waters of their town, asked how they could be involved in such events. This community support and interest was very satisfying to the volunteer divers.

The event was coordinated by Jon Hardy of Argo Diving Services, Avalon, Catalina.

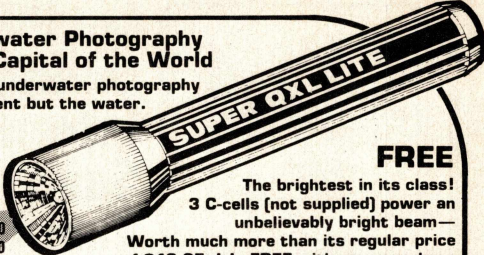
DIVERS WEEKEND

Recently, during a special two day program of underwater activities sponsored by the Penn State Nittany Divers scuba club, 140 people were introduced to the sport of scuba diving. After a brief period of instruction, and accompanied by safety divers, each participant tried his/her skill at underwater backgammon, a jigsaw puzzle, or an obstacle course.

The Nittany Divers designed Underwater Weekend for people who want to experience scuba diving without committing themselves to a certification course. And, not surprisingly, many of the participants sought information on full certification after the introductory dive.



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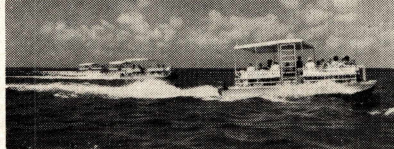


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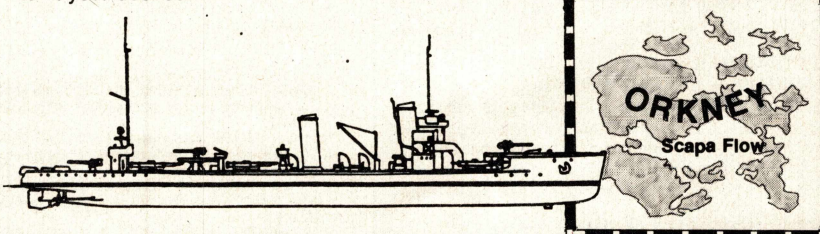
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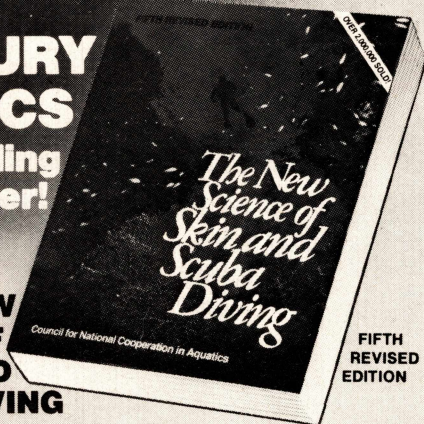
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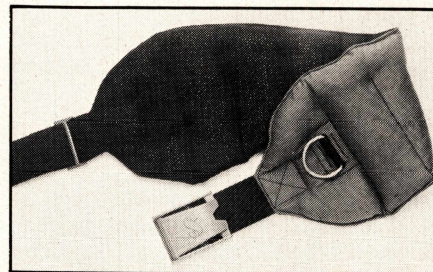
Mesh Weight Belt

**It's Form Fitting
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BY JIM WALKER

Occasionally, when I pack for a trip, I can't help but sit back and admire the ingenious inventions that have gone into my gear bag. Although some items have lost their new look over the years, I have a certain affection for each. But, there is one item I just can't seem to warm up to — my weightbelt. It does what it's supposed to do, but it can't be packed in my bag, and it has to be carried separately so it won't crush my more delicate equipment. And, wearing it, I have to be extra careful so as not to harm the boat, my boatmates or their gear.

However, there is an alternative — Scubapro's Mesh Weightbelt. It's a fabric belt five to seven and one-half



inches wide and filled with lead shotgun pellets. These provide even distribution of the weight without the hard edges and concentrated crushing force found in solid weights. Thus, the mesh belt greatly reduces wear and tear on equipment and greatly increases diver comfort.

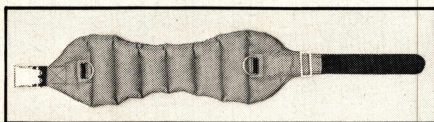
The belt is shaped like a flattened dumbbell with the narrowest part in the middle. When worn, the narrow area is on the diver's lower back. This keeps the belt from interfering with the position of the tank backpack.

The body of the belt has blue Cordura nylon on the outside and black nylon mesh on the inside. Water will drain quickly out through the mesh as the diver exits. Black nylon webbing (such as that used with typical weightbelts) is sewn into the ends of the belt body and forms the adjustable, belt-like portion of the unit. Thus, the mesh belt is worn and used like conventional weightbelts.

The stitching on the mesh belt is done with heavy, black nylon thread, doubled at stress points. The buckle of the belt is the clamp type, made of orange plastic.

It is notched to make it easy to distinguish from a tank strap buckle by touch. A stainless steel buckle is also available. Two stainless steel D-rings are secured to the outside of the belt by black nylon webbing, double stitched completely through the fabric and mesh.

The belt is filled by pouring lead shot through a small opening under the fabric at one end of the belt body. A stainless



steel slide keeps this opening shut after filling. The belt body is divided into eight sections, or pockets, which share a common opening at the top.

Scubapro recommends the belt be filled with #4 shotgun pellets (.13 inch in diameter). These can be found in some dive stores and in most gun shops and sporting goods stores. Larger shot (smaller shot number) may be used, but these pellets will not pack as tightly and thus reduce the amount of lead the belt can hold. The belt will hold up to 25 pounds of #4 shot.

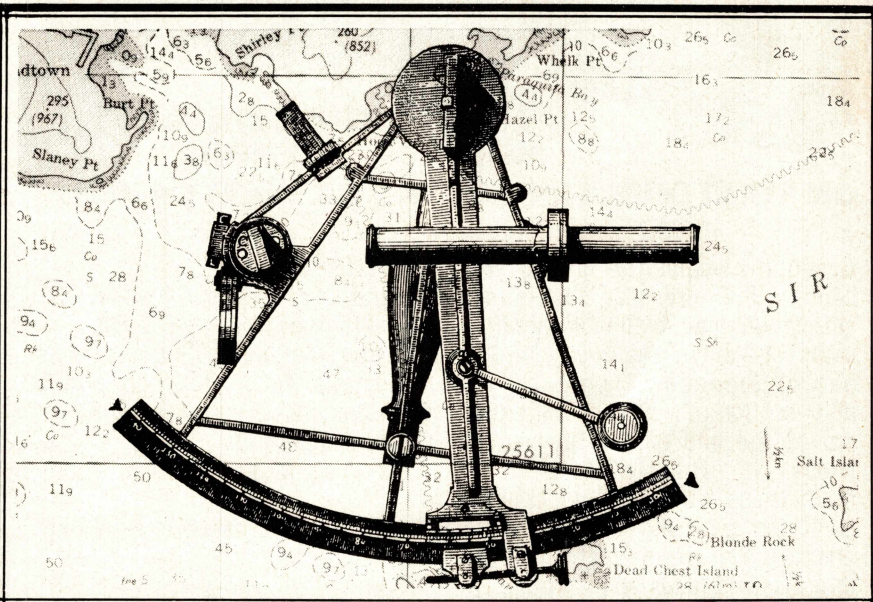
To fill the belt, pre-weigh the desired amount of shot and hang the belt vertically from a vise or clamp with the opening at the top. Insert a large funnel into the opening to guide the shot as it is poured. (A rolled piece of cardboard will work.) Shift the shot from chamber to chamber as the belt fills. When all the shot is in the belt, distribute the shot evenly and seal the open end of the belt by moving the slide over it.

If desired, the diver can complete the stitches which separate the pockets and thereby eliminate pellet travel between sections. (If this is done, I'd go one step further and sew the opening of the belt shut ahead of the slide.) The stitching can be removed if the diver wishes to change the amount of shot in the belt. Obviously, with or without the additional stitching, altering the weight of the mesh belt is not as simple as with conventional weightbelts.

Care of the mesh belt should include a thorough, vigorous rinse in fresh water. It should be completely dry before storage. Beach divers may find that small grains of sand can pass through the mesh into the belt. These should be rinsed out, otherwise the diver might find sand continually showing up where it isn't wanted (gear bags, car trunks, etc.). The mesh belt is sturdy, but it should be treated with reasonable care. While a typical weightbelt might survive continual tossing into the back of a van or a 20 foot drop from a beach cliff to the sand, this one might not.

The Mesh Weightbelt sells for about \$25 (without lead shot) and is available from Scubapro dealers. It comes with complete instructions for assembly and filling. 

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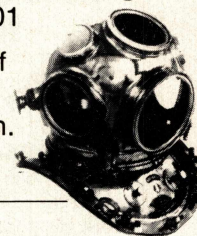


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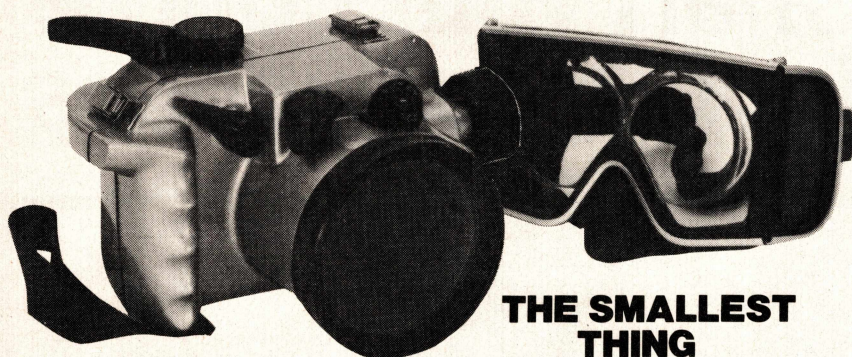


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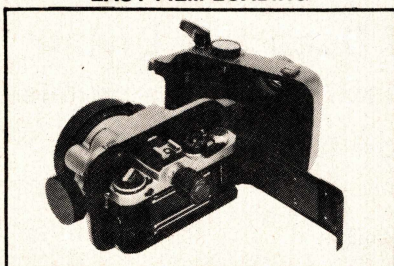
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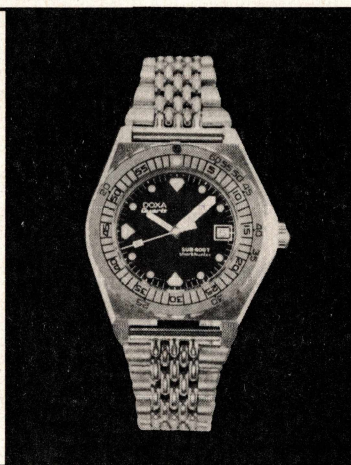
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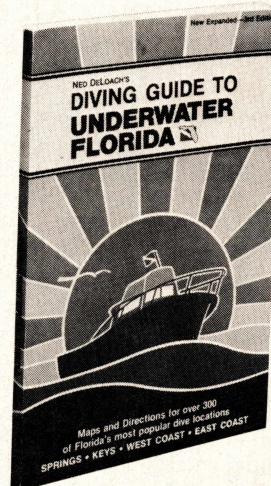
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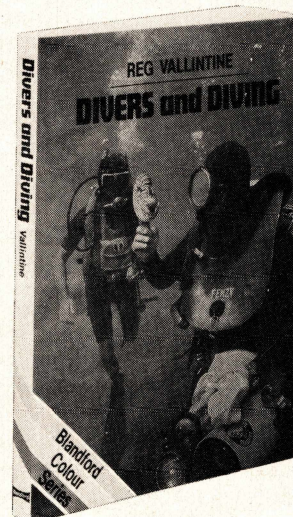
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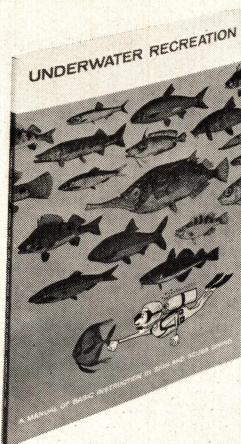
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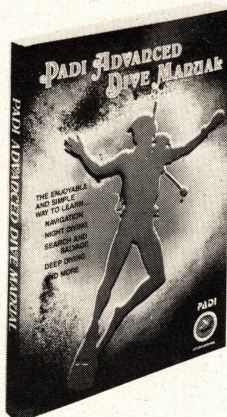
1 Diving Guide to Underwater Florida — Florida's most popular dive areas are grouped into 21 separate sections and the dive sites within each section are discussed as to location, depth, visibility, special equipment necessary, etc. \$4.95. From New World Publications, 1861 Cornell Rd., Jacksonville, FL 32207.



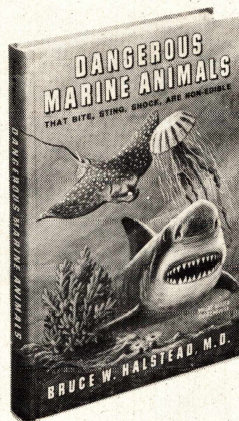
2 Divers and Diving — A general overview of diving from ancient attempts at salvage to modern equipment. Many of diving's pioneers and their accomplishments are noted. Color photographs and drawings are included. \$6.95. Sterling Publishing Co., Inc., Two Park Avenue, New York, New York 10016.



3 Underwater Recreation — This manual on sport diving is accurate and humorously illustrated. While simple, it covers the important aspects of diving from equipment and medicine to environment and dive skills. Emphasizes So. Cal. diving. \$5. From U/W Unit, L.A. Co. Parks & Recreation, 155 W. Washington Blvd., L.A. CA.



4 PADI Advanced Dive Manual — This text provides detailed information in a clear format on techniques vital to the advanced diver. Areas from navigation to deep diving are covered and study questions are included (with answers). \$13.95. From PADI, 2064 North Bush Street, Santa Ana, California 92706.



5 Dangerous Marine Animals — Describes potentially dangerous marine animals from sharks to plankton and includes information on avoiding injury & first aid. Well illustrated, this reference includes detailed descriptions as well as scientific & common names. \$15. Cornell Maritime Press, Box 456, Centreville, MD 21617.

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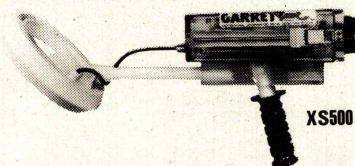
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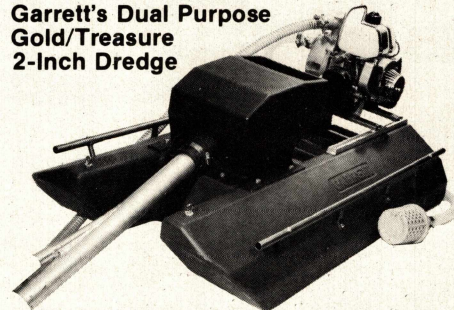
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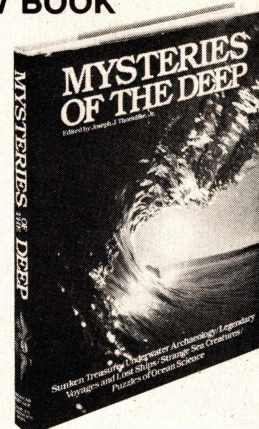
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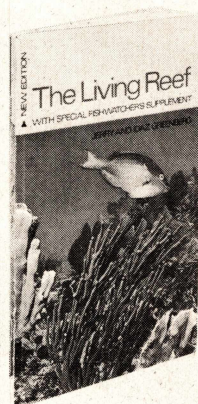
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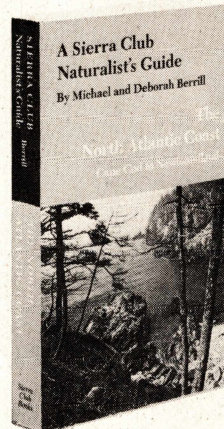
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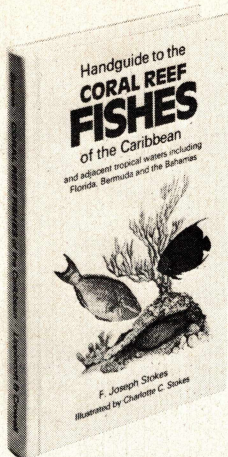
6 Mysteries of the Deep — Ocean mysteries of treasure, unusual voyages, monsters and natural phenomenon, from ancient days to the present, are analyzed. Many illustrations are included. \$34.95. From the American Heritage Publishing Company, 10 Rockefeller Plaza, New York, New York 10020.



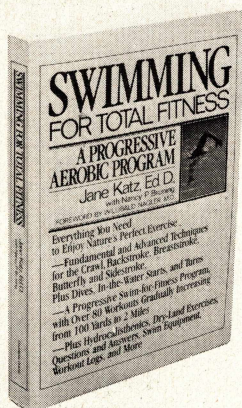
7 The Living Reef — The magic realm of the coral reef is shown in 107 brilliant all-color photos taken in the open seas of Florida and the Caribbean. This new edition has a special fishwatcher's supplement. Idz & Jerry Greenberg. \$8.95 plus \$1.05 postage. Seahawk Press, 6840 Southwest 92nd Street, Miami, FL 33156.



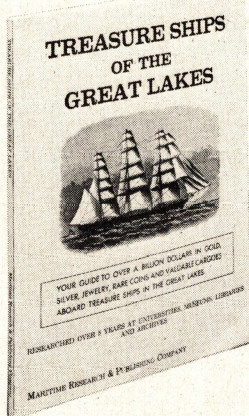
8 A Sierra Club Naturalist's Guide to the North Atlantic Coast — This reference contains background information on the geology and climate of the area as well as detailed coverage of the species inhabiting the seashore communities. \$24.95 cloth, \$10.95 paper. Sierra Club Books, 530 Bush Street, San Francisco, CA.



9 Handguide to the Coral Reef Fishes — Illustrates nearly every species the diver is likely to see on the coral reefs of the tropical western Atlantic. Non-technical, this guide emphasizes the shape, color and behavior which distinguishes each animal. \$9.95. Pub. Dept., Academy of Nat. Sciences, Phila., PA



10 Swimming For Total Fitness—Gives the reader everything that he or she will need to make swimming an all-around fitness program. Covering why-to and how-to, this book teaches beginning and advanced swimming, diving and training techniques. \$10.95. Dolphin Books/Doubleday & Co., Inc., Garden City, NY.



11 Treasure Ships of the Great Lakes — With emphasis on those ships which are known to have large quantities of gold coins and bullion in their safes, this work describes each wreck including name, type, tonnage, date of sinking, location, depth and cargo. \$9.95. Maritime Research & Pub. Co., 1164 1st Natl. Bldg., Detroit, MI.

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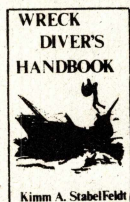
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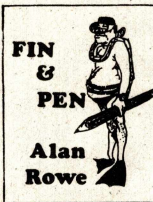
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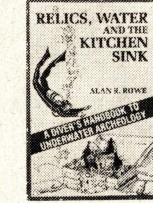
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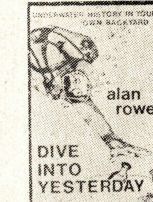
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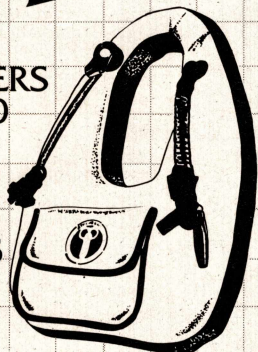
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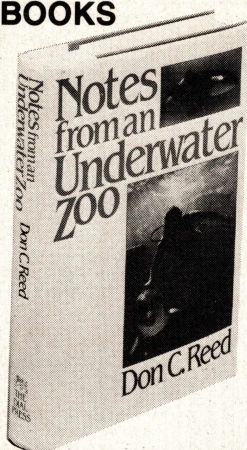
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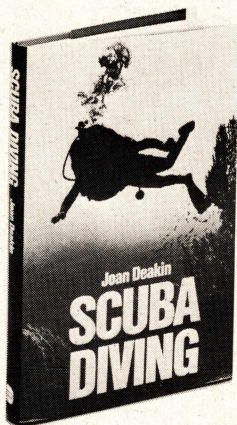
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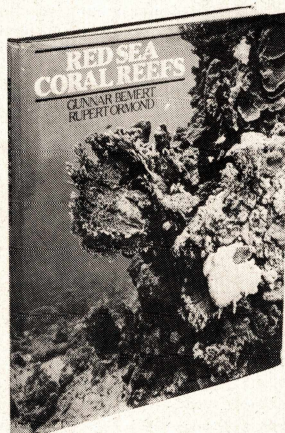
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13 Scuba Diving — Written for the beginning sport diver, this book covers a wide range of information from dive physics and physiology to equipment, boat handling and underwater photography. Factual information presented clearly. Some British terminology. \$11.95. David & Charles, North Pomfret, Vermont 05053.



14 Red Sea Coral Reefs — Gorgeous color photographs enhance this coverage of the reefs and their inhabitants. Explores the formation of coral reefs worldwide. Aspects of Red Sea diving are covered including how, where and the possible dangers involved. \$45. Routledge & Kegan Paul, Ltd., Ayer Bldg., Lawrence, MA 01843.

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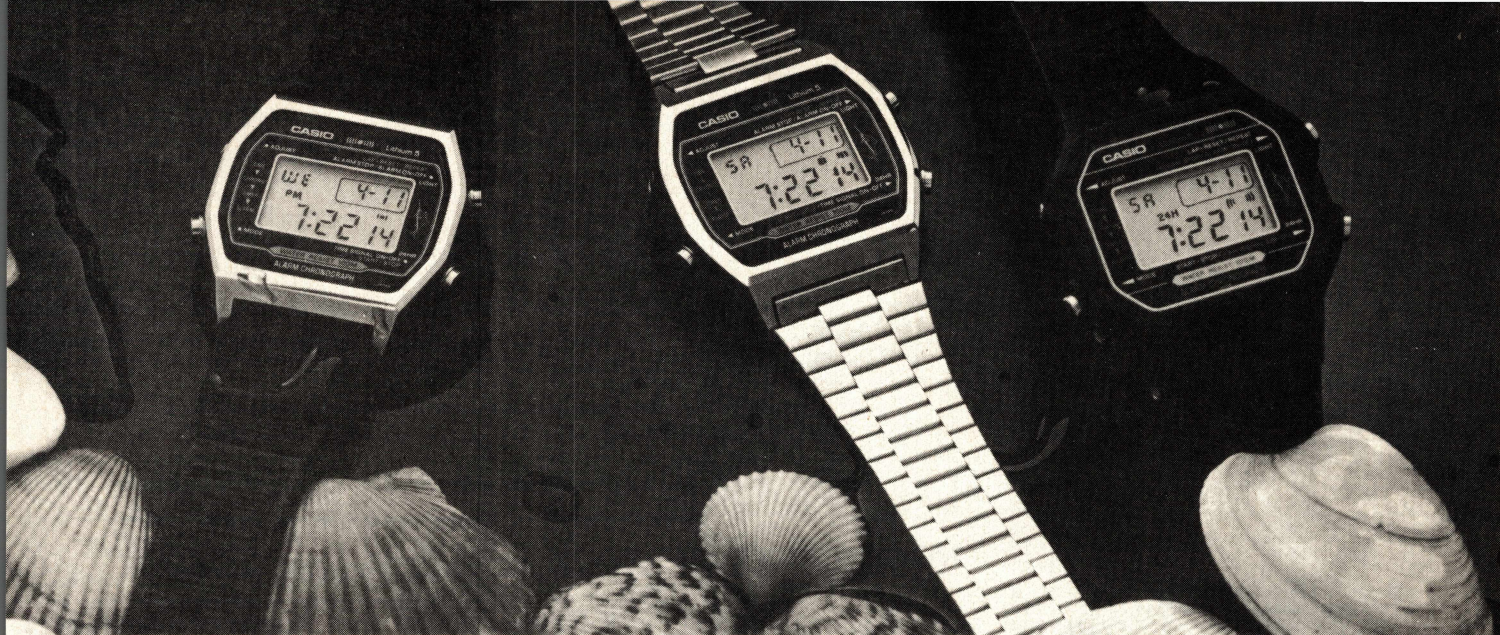
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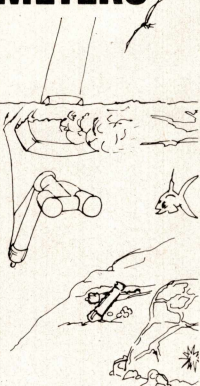
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DIVERS DEN ANNIVERSARY

The Divers Den, Inc., Baltimore and Maryland's oldest professional dive store, celebrated its 24th anniversary on March 29. What started as a sideline for Joe Dorsey has grown into a fulltime enterprise. Customers come from as far away as Harrisburg, PA.

The Divers Den, Inc., 8105 Harford Road, is open six days a week: Mon., Tues., Thurs. and Fri. 9:30 'til 9:00 and Wed. and Sat. 9:30-5:00. Call (301) 668-6866 for information. 🐠

NEW PADI SPECIALTY

Diving in the ocean presents special problems and demands skill in areas such as: conditions of the water, waves, currents, entries, orientation, safety, rescue, awareness of ecological factors, proper use of the BC, proper weighting, dangerous marine life, first aid, etc.

Ocean and Reef Diving is the newest specialty added to PADI's expanding program of diver education. Developed by Al Marques, the director of the Underwater Activities Program of, and scuba instructor at, John Pennekamp Coral Reef State Park in Florida, it covers all the aspects cited above. The three day course is offered to divers and instructors who need this first hand experience and information for their own use or for teaching.

Two ocean and reef diving courses will be offered at Pennekamp in May and June. For information contact Al Marques at Pennekamp, P.O. Box 13-M, Key Largo, Florida 33037. 🐠

LA PORTE'S ANNIVERSARY

LaPorte's Skindiving Shop on Lake Sunapee in Newbury, NH is celebrating its 25th anniversary this summer.

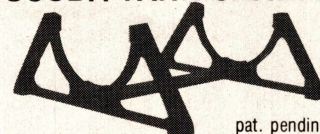


Both Wayne and Judy LaPorte are instructors. They are shown here with their two children (Teriko and Wayne, Jr.) on an ice dive.

LaPorte's is the oldest dive shop in New Hampshire and a five star PADI facility.

For information contact LaPorte's Skindiving Shop, Box 53, Newbury, NH 03255; (603) 763-5359. 🐠

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The TANCHOR® scuba tank cradle is designed specifically for safe transportation and storage of your tank in auto or dive boat. Eliminates potentially dangerous rolling and sliding of tanks. Quality molded in vivid yellow high impact polymer. No straps or clamps, self-leveling. Please specify 50 or 80 aluminum or 72 steel tank.

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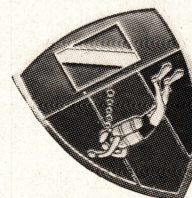
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GEORGE EVANKO & ASSOCIATES

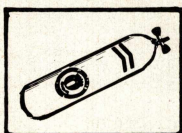
106 SCOTTSDALE DR.

CORANAPOLIS, PA 15108

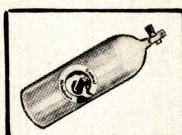
PHONE (412) 264-2601

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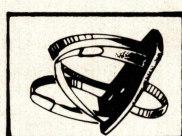
This Month's Super Specials!



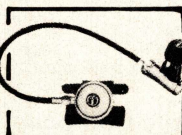
U.S. DIVERS TANK
80 Cu. Ft. aluminum with lifetime guarantee. Finest tank made. List \$280.
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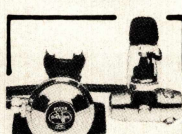
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\$35. CINCH KAM PAC



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\$129. U.S.D. CALYPSO
\$ 64. U.S.D. OCTOPUS



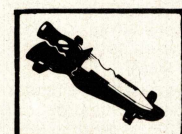
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Rechargeable rated #1. Super bright light lasts 3 hours. 1 year guarantee. List \$110.
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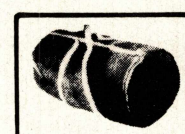
2001 STROBE
Farallon/Ocean pro model. Rechargeable wide angle with E/O; Nik II; Nik III. List \$550.
\$399. 2001 STROBE



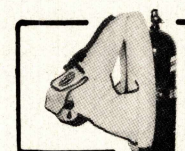
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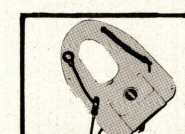
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\$169. SEA OTTER



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\$149. NEMROD AIR B.C.



U.S. DIVERS BC 700
New 1982 cordura B.C. Lever dump. CO₂. Low pressure inflator. Whistle, etc. List \$210.
\$129. BC 700



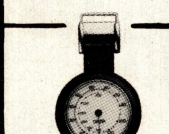
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\$189. U.S.D. BRUTE



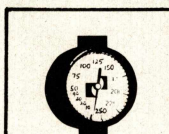
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\$45. TUNIC



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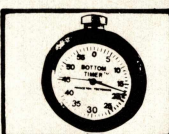
TEKNA MAX DEPTH
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\$59. TEKNA DEPTH



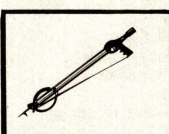
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\$55. COMPETITION GUN

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TECHNIFACTS

(Continued from Page 11)

what appeared to be a great potential for a dive news sheet. In the next few months we probably talked two or three more times and in December, 1951 the first SKIN DIVER was on the stands. I suspect that it was a marginal undertaking for several months because both Jim and Chuck kept their jobs. Eventually they were both able to devote full time to SDM and expect to have food on the table.

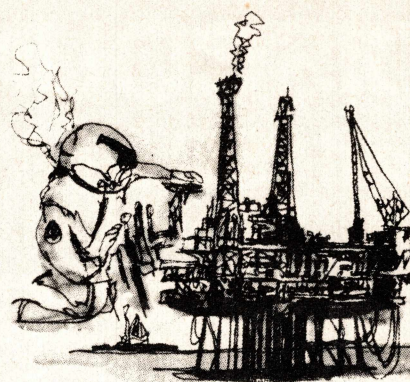
Later, in 1954, I published another dive news sheet called Divers News. This too was designed as an in-house publication with very limited circulation, primarily as a means of advertising the Sparling School and Divers Supply.

The November 1981 SKIN DIVER contained an article by George Cozens, Evolution of the Regulator. Referring to page 92, I believe the Rouquayrol dive apparatus was not a true demand unit. It did deliver air to the diver to meet his breathing needs at depth but an examination of drawings of the unit indicates this was done by a manually controlled valve. A similar system was developed by the Japanese during World War II for use by their Kamikaze divers. When landing craft neared shore, the Kamikaze divers would poke the craft with bangalore torpedoes, blowing both diver and landing craft into fairly small pieces. The valve in the Japanese dive suit was in the full facemask of the flexible diving hood-mask and was operated by the diver biting down on the two parts of the valve handle when air was to be inhaled. When released, as for exhalation, air flow stopped until the valve was again operated.

A true demand valve was developed by a man named Berg (I believe this was the Victor Berg of pearl diving fame) for use with a facemask manufactured by Ohio Ruber Company in the early 1940's. This was used extensively by shallow water divers during the clean-up of Pearl Harbor after the Japanese attack in December, 1941. The mask unit used a surface air supply.

The Cousteau-Gagnan two hose regulator was a patented device and any two hose regulator manufactured was an infringement on the patents. The patent was on the idea of bringing the exhalation hose back to the demand regulator on the diver's back to reduce breathing resistance. After a few threats of lawsuit, manufacturers who wanted to manufacture a two hose regulator simply paid royalties to the holders of the patent.

In 1950, I developed the first single hose regulator with the first stage on the tank and the second stage and demand valve at the diver's mouth. This unit was intentionally placed on the market without a patent on the idea. This permitted



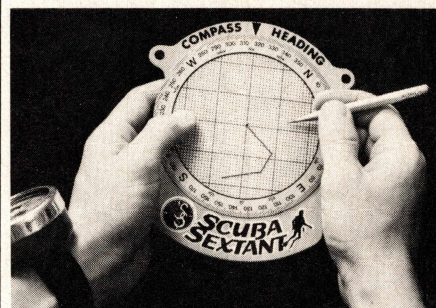
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anyone to manufacture a single hose regulator without worrying about patents or royalties and opened the market wide for the development of safe diving equipment. These first single hose regulators were called the Sport Diver and sold for \$79.95 complete with tank and harness. Since then, some manufacturers of single hose regulators have developed their own valving systems which they have patented and advertise; such as tilt valves, balanced piston type, and others.

By the way, the illustration of divers working out of a diving bell (page 78, November 1981) was taken from Trend Book, Skin Diving Annual which I wrote for Petersen Publishing Company in 1956. It depicts the diving bell used by Sir William Phipps in salvaging the treasure from the Silver Shoals — for which he was knighted and later made governor of the Massachusetts colony. Air was re-



Prototype of the Sport Diver being tested in Sparling School training tank in 1950.

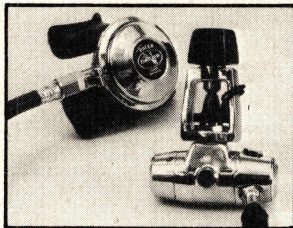
plenished in the bell by raising the small wooden barrel to the surface where it became filled with fresh air. As the barrel was pulled down to the bottom by the weights around its bottom, the air within the barrel was forced through the hose and into the diving bell. Excess air escaped from around the bottom of the bell, or out the cracks, more likely.

The third SDM article that Technifacts would like to comment on is in the August, 1981, issue, page 64, entitled Peppermint Stick Lobster. This brief article discusses what the author, Steve Lucas, was able to find out about the rather rare lobster, *Justitia longimanus* (H. Milne-Edwards, 1837).

This comparatively small lobster is found worldwide in warm tropical waters. It has been reported from Bermuda, among most of the West Indies, off the Mauritius, in the Caribbean along the shores of Mexico and South America (at least Venezuela), and in Hawaiian waters. In Hawaii only about six specimens have been collected so far and, until 1975 only two specimens had been collected in the entire Pacific Ocean area. Since 1975 a number of specimens, three or four, have been collected

(Continued on Page 114)

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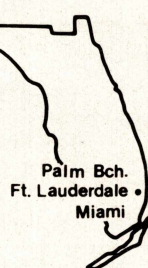


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SHARKS: MYTHS AND MYSTERY

Shark attack! Whether it's written in a newspaper headline, shouted on a beach, or even just spoken, it's always been a phrase that perpetuates the image that sharks are man-eaters. Most of the long-time human fear of shark attack stems from ignorance — for centuries man has known little about why or whom or where a shark might strike. But scientists — who admit there's still much to learn — have been collecting and analyzing data about the circumstances surrounding reported shark attacks. One thing these studies show is that less than two dozen of the nearly 350 known species of sharks are potentially dangerous to humans.

How dangerous? To a degree, that's a matter of educated guesswork. Statistics are sketchy because worldwide reporting systems are poor. But shark researcher, Dr. H. David Baldrige, of Sarasota, FL says, "Certainly you're in far more danger of having a car accident on the way to the beach or of drowning as you swim than you are of being the victim of a shark attack." Available statistics indicate that's very true. John J. McAniff, director of the International Shark Attack File at the University of Rhode Island, says that each year there are only 40 to 50 documented shark attacks throughout the world. A number of reported shark attacks that reach the public in blazing newspaper headlines or in sensational magazine stories can't be verified. But when an investigation can be made, it often turns out that the attack was something else — everything from deliberate fakery and blatant lies to the victim's misidentification of the real cause of the attack.

The vast majority of people are safe from the vast majority of sharks. Sharks, for the most part, go peacefully about their business, the ecologically important task of clearing the seas of the carrion, garbage, and sick and dying fish on which sharks habitually feed.

SHARK MYTHS

But the fact remains that there are shark attacks, and those attacks — quick

and terrible as they may be — have given rise to a body of popular inaccuracies about how sharks behave, inaccuracies like these:

Sharks attack humans because they're hungry. That's generally false. Dr. Baldrige says his research indicates that about 80 percent of shark attacks are not motivated by hunger, and most researchers agree. So why does a shark attack? Nobody knows for sure, but research indicates that an attacking shark might be trying to protect its territory, or responding to a perceived threat. Circumstances of other attacks indicate that a swimmer or diver is occasionally mistaken for a seal or large fish, the natural prey of many sharks. And, research in this direction has poked holes in a common belief about sharks: Hungry or not, sharks are generally not man-eaters. In fact, after a first bite, most sharks won't continue biting a human. That's why about two-thirds of shark attack victims survive.

Sharks are mindless perpetual motion machines relentlessly prowling the seas. That's a frightening and largely false idea. Sharks, while they won't win any awards for brilliance, aren't mindless. In some intelligence tests, they've been shown to solve problems in the same time it takes laboratory rats.

It was once thought that because they don't have air bladders like bony fish do, sharks had to swim constantly to force water, and therefore oxygen, through their gills. Research now shows that's not true for some species of streamlined sharks. Dr. Eugenie Clark of the University of Maryland reports finding motionless sharks in underwater caves off the coasts of Mexico and Japan. The sharks were first thought to be asleep, but her studies showed that they were simply quiescent — reposing at underwater cleaning stations where tiny sucker fish picked parasites off their skins and gills.

When sharks are active, they're extremely efficient hunters — and sometimes efficiency can look like relentlessness. The shark depends on its senses of sound, smell, and sight, and on receptors that pick up low-frequency vibrations. Ordinarily, sharks use all these capabilities to hunt food; unfortunately, they can occasionally detect a human who has entered the shark's domain.

SHARK PROTECTION

While research into shark behavior goes on, confirming some popular beliefs and disproving others, parallel research is investigating ways to protect man from sharks. In the past, physical barriers, such as the underwater mesh nets used near beaches in Australia and South Africa, have proved more effective than chemical repellents. But current studies are taking steps in both directions.

Several researchers are tackling the

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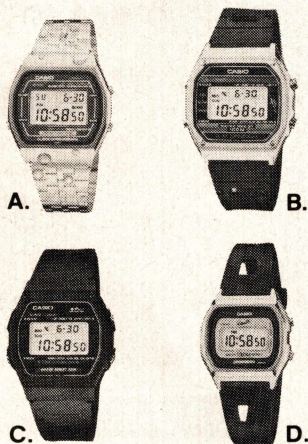


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SHARK ATTACK

physical barrier problem. Among them are Dr. C. Scott Johnson, whose work at the Naval Undersea Center in San Diego has produced a large floatable plastic bag that protects the human inside it from the shark's senses of sight and smell. And Australian filmmakers, Valerie and Ron Taylor, with marine biologist Jeremiah Sullivan, have developed a stainless steel mesh suit — in effect, a suit of armor — which has proved effective in blunting shark bites. However, there is a concerted research effort being made to find an effective chemical repellent.

The University of Maryland's Dr. Eugenie Clark has discovered that a flounder-like fish — the Moses sole — common to the Red Sea, can prevent



photo/Marty Snyderman

shark attack. Investigation has shown that the Moses sole exudes a milky substance that contains a toxin which repels sharks. Now, research scientists are working on problems involved in synthesizing the chemical, or finding one like it that will work as well.

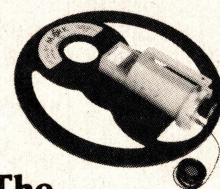
Research into shark deterrents has turned up some surprising — and not very good — news for sea disaster victims. In the standard sea-rescue scenario, the victims bob in highly visible, bright yellow rafts as they await rescue by helicopter. But studies indicate that both bright, highly reflective colors and the vibrations from the helicopter's sound attract sharks to the site.

SHARK SAFETY

While the studies go on, people who want to play or work in the oceans wonder how to minimize their chances of being attacked. Experts who have investigated shark attacks offer these suggestions:

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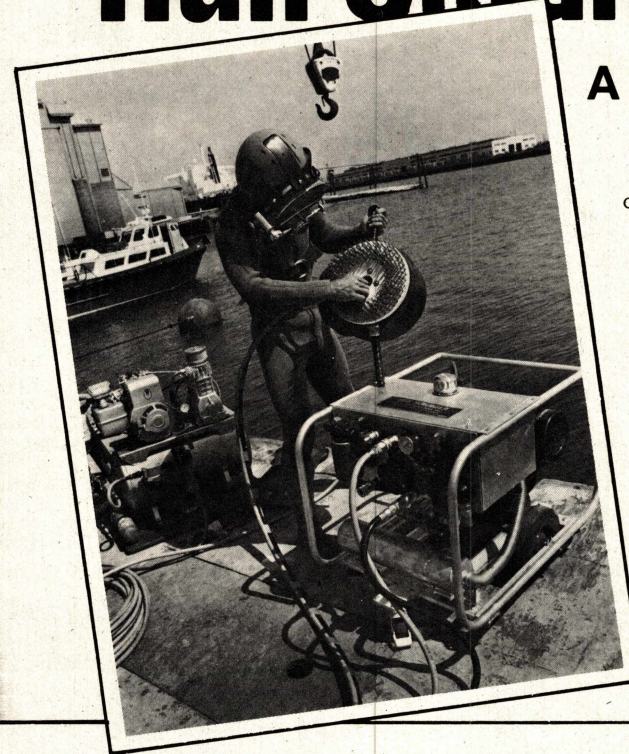


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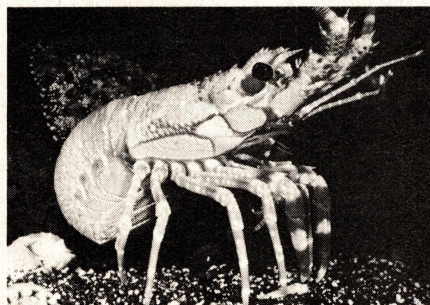
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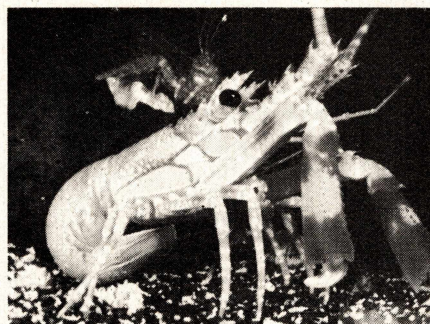
(Continued from Page 109)

by myself and another diver. All the later specimens were taken in a deep cave with a slit entrance. The common name for this little creature is the long handed spiny lobster.

The unusual thing to Technifacts is the considerable difference between Lucas' specimens and those collected in Hawaii. In the Hawaiian type, both male and female of *J. longimanus* have clawed front walking legs. However, the claws of the male are much larger than those of



Female *J. longimanus*



Male *J. longimanus*

the female. Also, the size and number of spines in the Hawaiian type appear much different. Based on photos only (admittedly not a good way to judge species differences) it would appear that either the Hawaiian or the Jamaican peppermint stick lobster is not really *Justitia longimanus*. Undoubtedly both are of the genus *Justitia* but one or the other may possibly be a new species. Some marine biologist should ask the real *J. longimanus* to please stand up. I would appreciate hearing from readers throughout the world who know this interesting little animal. (Write E. R. Cross, c/o SKIN DIVER Magazine, 8490 Sunset Blvd., Los Angeles, CA 90069.)

Now, back to the January 1982 SDM, page 37, The Diver Who Saved Winchester Cathedral. In case you tried and could find no ready reference to Winchester Cathedral, the reason is that Winchester is an Episcopal see (or church territory) containing the Cathedral of St. Swithun, popularly but not accurately known as Winchester Cathedral. Be that as it may,

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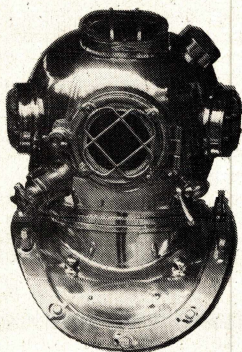
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diver Walker did perform some mighty fine diving in helping to rebuild the foundation of the cathedral. However, a study of sketches and description of the work done for this restoration would indicate that the divers placed only the bagged concrete to make a small area watertight, after which the water was pumped out and the work of placing the thousands of concrete blocks and bricks done by numerous conventional masons. Since the work had to be done in small increments of six to ten feet to prevent collapse of the cathedral foundation, the diver would make each small section watertight with the bagged concrete, wait until the masons completed building the new foundations, then begin making another small section watertight. Considering that some of the walls of St. Swithun Cathedral are more than 500 feet long, it is little wonder that this turned out to be one of the longest diving jobs on record, lasting from 1906 to 1911. Most of the critical work was done by W. R. Walker but he did have assistant divers, one of whom was named J. S. Davis. The source of air was hand pumps turned by four man crews; two on each side of the pump with relief crews every half hour. The depth of the water, (more accurately silty ooze) was 14 feet. Visibility was absolute zero.

SHARK ATTACK

Many shark attacks occur when a swimmer is alone or has just left a group.

Don't swim in the ocean at dusk or at night. Tagging studies show that's when the large sharks come in close to shore.

Look before you leap. That's always a good idea, but especially so when you're jumping off a dock or boat into potentially shark-infested waters. That's the shark's "turf," and the shark might well try to defend it.

Think twice about swimming if you have a bleeding wound.

If you see signs of a shark's presence (schools of fish feeding, for instance) or a shark itself, get out of the water with as little commotion as possible. Don't thrash, don't move jerkily — just leave.

If all else fails and you find yourself faced with a shark attack, experience indicates that self-defense can help. Try hitting the shark in a sensitive area — the nose, gills, or eyes — to startle or even hurt the shark enough to buy time to escape.

Statistically odds are on man's side. Shark attacks are rare, and researchers continue to work on methods of prevention. Meanwhile, the humans who venture into the sharks' domain seem to do best if they adopt an attitude of what Dr. Baldrige calls "respectful caution — coupled with a very real admiration for an animal beautifully developed and beautifully adapted to its environment."

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